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Evaluation of Sexual Orientation Items in Population Health Surveys Among Canadians: A Mixed Methods Approach

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Graduate Program in Epidemiology and Biostatistics
A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science
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Abstract

A single item sexual orientation question has been asked in Statistics Canada health surveys to identify health inequalities in Canada. Using a mixed methods study with a convenience sample of Canadians, we evaluated this question in comparison to a set of US questions that included domains of sexual identity, behaviour and attraction. The single item question had an 85.8% sensitivity and 100% specificity in capturing sexual minorities from the broadest definition ($n = 311$). Chance-corrected agreements with sexual identity, 12 months and life time sexual behaviour were 0.89, 0.39 and 0.48 respectively. Both trans and cisgender people revealed that there were problems with the question, although trans people were more likely to be unclassifiable by the single item question. Findings suggest the need to further refine this question for more accurate identification patterns of health in Canada.

Keywords

Sexual minority, sexual orientation, survey methods, gay, bisexual, health inequities, homosexuality

Co-Authorship Statement

All chapters were written by Christoffer Dharma and were intended to fulfill the requirements of his Master's degree in the Department of Epidemiology & Biostatistics. Data were based on the "Improving Health Research" project, a part of the larger grant "Improving quantitative research methods in gender, sex, and population health: Theory, empirical evidence and development of applications for multi-dimensionality and intersectionality" funded by the Canadian Institutes of Health Research (FRN# MOP-130489). The idea for the project was initially developed by Warren Michelow (WM) and Dr. Greta Bauer (GB). A team that included GB, Ayden Scheim (AS) and myself expanded on the project, designed the study protocol, demographic questionnaires and ethics protocol. Dr. Jessica Braimoh (JB), project coordinator, conducted most of the qualitative interviews and recruitment for the project, and analyzed qualitative data, with me doing some of them myself. Rachel Giblon (RG) worked as a research assistant by emailing participants and deidentifying interview materials.

Together with the team, I was involved in all activities relating to the project, writing the ethics proposal, collecting data, recruitment, conducting qualitative interviews, disseminating knowledge translation activities, creating quantitative variables and conducting all data analysis pertaining to this thesis. Peer review publications, posters and oral presentations from this thesis have been submitted or are in progress by myself together with co-authors: GB, JB and AS. Analysis in this thesis was developed by myself with revisions and suggestions from Dr. Bauer and the committee. All parts of this thesis were written by myself with feedback and suggestions from the committee: Dr. Greta Bauer, Dr. Guangyong Zou, Dr. William Fisher and Dr. Kathy Speechley

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Glossary of Terms

Agender: an identity used to describe those who feel that they do not have a gender identity. Terms such as gender neutral can also be used

Asexual: A sexual orientation identity generally characterized by not feeling sexual attraction or a desire for partnered sexuality

Bicurious: an identity used by heterosexuals to describe curiosity and attraction to the same sex that one may or may not act on

Biological sex: a term used to describe one's chromosomal, hormonal and anatomical characteristics that determine if one is male or female

Bisexual: an identity used to describe those who are attracted to both males and females

Cisgender: term used to describe individuals whose gender identity matches the sex they were assigned at birth

Cisnormativity: the assumption that everybody has a gender and they are always cisgender

Cognitive interview: an interview method used to understand how respondents understand a survey question

Gay: identity used by men who indicate attraction to other men (or sometimes women who are attracted to other women)

Gender binary: a term used to describe the idea that there are only two genders, males or females and one can always be classified as either one

Gender identity: the gender that individuals identify themselves with, which may not always match the sex they were assigned at birth

Gender minority: a umbrella term that encompasses those whose gender identities are that of a minority (i.e. not cisgender) and may include those who trans and non-binary

Genderqueer: an identity used to describe those who do not conform to a gender binary and may identify with a third gender; another term used is gender non-conforming

Heteronormativity: the assumption that everybody is heterosexual and is only attracted to the opposite sex

Heterosexual: an identity to describe a person who is primarily attracted to the opposite sex, also known as straight

Homophobia: a term used to describe negative attitudes towards those who identify or present themselves as a sexual minority

Homosexual: a more outdated term used to describe those who are gay and lesbian; the term was traditionally used to pathologize same-sex behaviours

Lesbian: identity used by females who indicate attraction to other females

Mostly heterosexual: a category that has emerged more recently to describe those who feel attraction to the same sex and may have had experiences with the same sex, but primarily identify as heterosexual

Non-binary: an umbrella term used to describe those who do not conform to a gender binary and may include those who are genderqueer or gender neutral, among other identities

Pansexual: an identity to describe those who can feel attraction to people of any gender; one's gender does not determine one's attraction

Queer: a term that was traditionally used to describe sexual and gender minorities in a negative connotation. The term has been reclaimed by the community and some individuals now use the word as an umbrella term to describe their non-heterosexual orientation

Sex assigned at birth: the sex that one was assigned at birth and written on one's birth certificate; generally determined through looking at one's genitalia

Sexual identity: the sexual orientation identity that one identifies as (heterosexual, bisexual, gay / lesbian)

Sexual minorities: those who with a sexual orientation who is not of the majority of the population

Sexual orientation: an enduring emotional, romantic, sexual or affectional attraction to other people. It was traditionally thought that people's sexual orientation can always be categorized as gay, lesbian, bisexual or straight

Skoliosexual: an identity to describe those who are attracted to non-binary and trans people (those who are not cisgender)

Transgender (trans): an umbrella term used to describe those who do not identify with the sex they were assigned at birth

Trans man; Trans woman: an identity label sometimes adopted by transmasculine (female-to-male) or transfeminine (male-to-female) persons

List of Abbreviations

AddHealth: National Study of Adolescent Health

APA: American Psychological Association

AS: Ayden Scheim

BC: British Columbia

BRFSS: Behavioural Risk Factor Surveillance Study

BSRS: Brazilian Social Research Survey

CCHS: Canadian Community Health Survey

CD: Christoffer Dharma

CHIS: California Health Interview Survey

CI: Confidence Interval

GB: Greta Bauer

GSS: General Social Survey

GZ: GuangYong Zou

ICC: Intraclass Correlation

JB: Jessica Braimoh

LGB: Lesbian Gay Bisexual

LGBT: Lesbian Gay Bisexual Transgender

LOI: Letter of Information

MIDUS: National Survey of Midlife Development

MSM: Men who Have Sex with Men

MSS: Minnesota Student Survey

NGI MSM: Non Gay Identified Men who Have Sex with Men

NAIAHS: National American Indian Adolescent Health Survey

NESARC: National Epidemiological Survey on Alcohol and Related Conditions

NHANES: National Health and Nutrition Examination Study

NPV: Negative Predictive Value

Natsal: National Surveys of Sexual Attitudes and Lifestyles

OHS: Ontario Health Study

PI: Principal Investigator

PPV: Positive Predictive Value

QAS-99: Question Appraisal System

REB: Research Ethics Board

RG: Rachel Giblon

SMART: Sexual Minority Assessment Research Team

STI: Sexually Transmitted Infections

WM: Warren Michelow

WSW: Women who Have Sex with Women

1 INTRODUCTION

This chapter will provide a brief introduction to the project, its rationale, my role in the project, and thesis objectives.

1.1 Rationale of the Study

Population health surveys are a major data source for epidemiological and health related studies. One purpose of these surveys is to obtain the most accurate information on the frequencies and distribution of illness¹, in order to identify patterns of health disparities, promote health equities across all subgroups, and protect the rights of minorities in the population of interest. To achieve this, all relevant subgroups in the population need to be represented². Hence, survey questions in the past years have undergone revisions to more accurately represent the changing demographics of the population. Surveys now include options such as “living with a partner” to identify unmarried couples who are cohabiting^{3,4} and questions on sexual orientation^{4,5}.

Survey researchers have used the term sexual minorities variably, but many researchers agree that sexual minorities are comprised of those with sexual identity, orientation or practice that differs from the majority of society^{6,7}. Many population-wide studies have documented significant health disparities between sexual minorities and heterosexuals², which highlight the importance of asking sexual orientation questions on population health surveys². To accurately identify the needs of minorities and patterns of health disparities, a survey item with consistent reliability that is clear and understandable to both minorities and non-minorities alike is necessary².

Sexual orientation questions on population health surveys have been asked to individuals as young as 12 years old without any upper age boundaries⁸. A survey that will be disseminated to every member of the population has to be able to accurately distinguish sexual minorities from heterosexuals for every member of the population, which could come from numerous demographic backgrounds. This could range from immigrants who may not speak fluent English and were not familiar with the concepts of sexual orientation, to transgender teenagers who may still be questioning their sexuality, to

cisgender (people who are not trans, whose gender matches the biological sex assigned at birth⁹) conservative farmers in rural areas who may never really consider the issues of sexuality and to white gay men living in big cities who were very well informed of these issues. To prevent inaccuracies and misclassification from either side, questions need to be evaluated among those who are sexual minorities, as well as those who are heterosexuals. Hence, this is a broadly important issue that involves all Canadians from a wide variety of demographics.

Currently, there is no general consensus on the best way to ask sexual orientation on a population survey. While there have been a few interview studies conducted on improving different survey questionnaires on sexual orientation, these were all focus groups targeted to specific groups of sexual minorities¹⁰⁻¹³. This is because most of these studies were specifically conducted to address issues in the community of sexual minorities and questions on surveys that were directed to the general population were largely ignored. To ensure that the questions work among minorities alone is not enough. If some heterosexuals are having trouble and responding inaccurately to these questions, findings will not represent the true health disparities observed in the population. There have been a few cognitive interviews conducted by the team that develops sexual orientation questions for the National Health Interview Survey (NHIS) and National Health and Nutrition Examination Study (NHANES)^{14,15}, which are both annual health surveys conducted in the United States (US). Their results had led to the finding that different problems with the original measure did exist for both sexual minorities and heterosexuals. The finding had helped to identify classification errors and led to rewording questions to serve the general population better^{14,15}, which led to more accurate responses and classifiable data¹⁶. However, this latest study by the NHIS has not received much attention¹⁷, as it was only reported as an internal NHIS report, rather than published in an academic journal.

To our knowledge, there have been no published Canadian studies that have been done to evaluate the validity and reliability of the sexual orientation items used in many population surveys in Canada. At the time this study was conceived, most health surveys conducted by Statistics Canada used a single item sexual orientation measure that has

been asked in large population health surveys such as the Canadian Community Health Survey (CCHS)⁵ and the General Social Survey (GSS)¹⁸. It seems reasonable to think that there might be problems associated with the item used, as has been shown by the cognitive interviews conducted in the US.

To complicate things further, many researchers in the field seem to believe that many North American youth today no longer identify with the traditional labels commonly used in most health surveys¹⁹. It is unknown if this trend has impacted the way youth respond to a sexual orientation questions with traditional labels. Furthermore, previous findings had raised more questions about how to truly interpret answers to a sexual orientation question. One's sexual identity does not always match with one's attraction or behaviour²⁰. In addition, many individuals were found to constantly renegotiate their sexual identity in different time, place and context²¹, which raised both validity and reliability issues with sexual orientation measures.

1.2 Current Study and Objectives

Given the current state of literature, the purpose of the present study is to evaluate the sexual orientation question used by Statistics Canada⁵, and to compare with the set of questions recommended by a US consensus committee, the Sexual Minority Assessment Research Team (SMART)³. This is a mixed method study that quantitatively assesses these items on Canadians, in addition to presenting qualitative results from cognitive interviews on a sample of Canadians with maximum variation sampling (from different ethnicity, linguistic background, sexual orientation, trans status gender, religiosity, religion, age, residence, education and knowing someone who is LGB). Cognitive interview is a technique used in survey research to understand how participants read and understand an evaluated question. To our knowledge, this will be the first Canadian study that assesses sexual orientation items on both sexual minority and heterosexual Canadians, and the first study to also quantitatively assess the concordance and validity of multiple sexual orientation items among the general population. Hence, for these reasons, the following objectives are proposed:

1. To identify the extent to which different domains of sexual orientation are captured and categorized from the single sexual orientation measure used in Statistics Canada surveys through measures of sensitivity and specificity
2. To measure concordance between different measures of sexual orientation and hypothesize reasons for discordance when it occurs
3. To explore the association between one's demographic characteristic, response to Statistics Canada sexual orientation question and sexual minority classification from multiple domains of sexual orientation
4. To determine groups who were more likely to be misclassified or unclassifiable on the Statistics Canada question and understand reasons for these classification problems

1.3 My Role in the Project

Data source for this thesis came from the “Improving Health Research” project, which was motivated by the idea that there exists multi-dimensionality in sex, gender, sexual orientation and racialization. This idea rooted from intersectionality theory, where one's societal position cannot be analyzed separately with regards to their sex/gender, sexual orientation, race, and social class. Traditionally, many researchers have equated measures of race to be proxies for social class and poverty. This means one's race can be used to determine if one lives in poverty and one's social class in the society. However, this perspective has been proven to be untrue and is no longer practiced in health research. Similar ideas can be applied to sexual orientation, sex, and gender, where multiple dimensions also exist and cannot be separated in explaining an individual's experience. In spite of this, many population health surveys have treated them as a unidimensional construct. This prevents transgender participants from indicating their gender on most surveys, which prohibits the evaluation of health disparities. Furthermore, both questions on transgender status and sexual orientation have never been assessed in the general Canadian population, especially among cisgender and heterosexuals. Finally, for surveys that identify ethnic minorities, they usually treat the concepts of a “person of colour” or a “visible minority” the same way, when in fact, many individuals do not perceive them as

the same questions. The differences between the two concepts have never been studied. Due to this, the objective of the project is:

“to assess issues of measurement validity for English-language survey items measuring sex/gender, sexual orientation, and racialization, in the context of the diversity of understandings of these concepts that exists in a multi-cultural, multi-generational Canada”²².

In assessing the multiple items from population health surveys to measure the three concepts, there was a total of six sets of items that were studied, two for each concept (sex / gender, sexual orientation and race / ethnicity). **The current thesis will only examine the sexual orientation measures.**

The Improving Health Research study came from the intersectionality grant that involves a team that includes Principal Investigator (PI): Dr. Greta Bauer (GB), co-investigators: Ayden Scheim (AS), Warren Michelow (WM), Dr. GuangYong Zou²² (GZ), research assistants (RA): me, Christoffer Dharma (CD) and Rachel Giblon (RG), and research coordinator: Dr. Jessica Braimoh (JB). Throughout the thesis, these individuals will be addressed by these initials. Ethics approval was given by The University of Western Ontario Research Ethics Board (REB). Together with the team, I contributed to various decision makings in the study, including but not limited to: modifying the survey questions and design, obtaining ethics approval, creating promotional materials, recruiting participants, interviewing some participants and conducting data analysis. I conducted all statistical analyses within this thesis.

2 LITERATURE REVIEW

This chapter begins with an introduction to a brief history of the concept of sexual orientation, explains the discordance among the different dimensions of orientation, and outlines how this could pose a problem to the current sexual orientation items, followed by a discussion on health disparities among sexual minorities. Afterwards, the chapter will introduce the two survey measures that were compared in this study, discuss results from previous cognitive interview studies and evaluation of the sexual orientation items used in previous health surveys. Then the chapter discusses previous findings on how different subgroups of the population (based on ethnicity, linguistic background, religion, education, socioeconomic status, and gender) understand sexual orientation differently and how this might affect their responses. Finally, the chapter ends with a discussion of the limitations in current literature, which motivates the current project.

2.1 History of Sexual Orientation

What is sexual orientation? While there are many definitions out there, today it is generally accepted that sexual orientation involves an identification to one of three categories, as defined by The American Psychological Association (APA)²³

“Sexual orientation refers to a person’s sense of identity based on those attractions related behaviours and memberships in a community of others who shares those attractions Sexual orientation is usually discussed in terms of three categories: heterosexual (having emotional, romantic or sexual attractions to members of the other sex), gay / lesbian (having emotional, romantic or sexual attractions to members of one’s own sex) and bisexual (having emotional, romantic, or sexual attractions to both men and women).”²³

Where was the origin of the idea of sexual orientation? From the works of Plato, Sappho and the Kamma Sutra, same-sex behaviours and attraction had been documented as early as 650 BCE²⁴. However, the idea of categorizing people based on sexual orientation, i.e. as “homosexual” or “heterosexual” only started to emerge in the 19th century^{24,25}, after the terms were first introduced by Kertbeny in 1868²⁴. With the rise of Judeo-Christian perspectives, anti-sodomy laws were enforced²⁴ and sexual acts between any male

persons either in public or private began to be criminalized²⁵. Hence, it was documented that the earliest questions on sexual orientation dated in the 1500s, where it emerged from churches that utilized information on sexual acts to make individuals confess their sins^{26,27}. Following this criminalization, the medical community was also starting to interfere in social issues; problem of “drunkenness” was medicalized and same sex behaviour came to be treated as an innate pathology²⁵. Krafft-Ebing popularized Kertbeny’s terms of “heterosexuality” and “homosexuality” which were presented in his work *Psychopathia Sexualis*^{24,25}. The classification of same-sex attraction as a mental illness marked a shift from the behavioural focus of same sex attraction towards a focus on identifying people with homosexual tendencies as mentally ill^{24,25}.

As society started to be divided on the medicalization of sexual orientation, more research was done in understanding people’s sexual experiences. A few studies had been done as early as the 1920s, although the most influential report came from Kinsey’s report in 1948. His report showed that same sex behaviour and attraction were quite prevalent. Thus, he argued that they should be normalized as another expression of human sexuality²⁸. He recognized that the same individual can have one type of relationship (same sex or opposite sex) at one period of his life and another type of relationship at another period²⁸. Kinsey believed this supports his idea that individuals cannot be categorized as heterosexual and homosexual, with many gradation in between²⁸. This gave rise to the idea of conceptualizing sexual orientation in a continuum of 0 to 6, which was known as the Kinsey scale^{24,28}.

With the rise of these reports that normalized homosexuality, anti-sodomy laws started to lose their prominence and resulted in two divisive perspectives on homosexuality²⁴. One group was those who saw it as a medical and pathological problem, and the other group was those who were fighting for equal rights for those with same sex attraction. Researchers such as Ulrich and Hirschfeld were ones who believed that same sex attraction was not an abnormal behaviour²⁵. They began their interest through studying the undifferentiated primordial gonads, which in early stages of human development can develop to either male or female reproductive organs²⁵. With societal pressure and gay rights movement in the 1970s, the medical community began to declassify homosexuality

as a mental illness, marked by the American Psychiatric Association removing it as a mental disorder²³. This official removal, together with the rise of gay rights movement and the Stonewall riots that took place in 1969²⁹, were speculated to be the main reasons for people to start publicly identifying as gay or homosexual⁷. Today, despite the recent legalization of same sex marriage throughout Canada and the US, societies are still divided on the issue throughout parts of the world. Some still perceive it as a mental illness and a religious sin or not infrequently as a crime, whereas others believe it is normal while still fighting for equal rights.

As homosexuality is no longer seen as a crime in most of North America, more and more surveys have asked sexual orientation questions to identify minorities. The debate has turned into whether or not sexual orientation is a multidimensional construct, which has been investigated as early as the 1920s. As Kinsey suggested in the 1940s, individuals were not to be classified as heterosexual and homosexual and yet many surveys still do this without asking any further questions. The idea of multi-dimensionality in sexual orientation started to reach prominence in the early 1990s²⁴. Klein's Grid of sexual orientation³⁰ best represented the predominance of this perspective, where sexual orientation was measured with seven items (sexual attraction, behaviours, fantasies, emotional preference, lifestyle, community and self-identification)³⁰. However, this measure was generally criticized for its complexity and was deemed impractical to be used for most surveys^{24,26}.

More empirical evidence of the multi dimensionality of sexual orientation came from the population based studies conducted by Laumann and colleagues. They have identified three dimensions of sexual orientation that are currently generally accepted, which are identity, attraction and behaviour²⁰. Through a nationwide survey of individuals from age 18 to 59 in the US in 1994, they provided one the first population based evidences that these three dimensions do not necessarily coincide with one another and prevalence of sexual minorities would differ depending on which dimension was assessed²⁰. This fact seems to be the accepted norm by most researchers in sexuality today.

2.2 Discordance of Sexual Orientation Measures and Sexual Fluidity

2.2.1 Discordance of Sexual Orientation Measures

Incongruity or discordance in orientation refers to the fact that one's sexual identity, behaviour or attraction do not always match one another^{31,32}. Sexual identity here refers to the sexual orientation identity that one holds (such as gay, lesbian, bisexual, straight, etc.). This is not to be confused with gender identity, which is the gender that a person identifies with. The umbrella term trans is used to describe people who have a gender identity that does not match with the biological sex they were assigned to at birth³³. One can be trans, be attracted to people of any gender and have a sexual identity of straight, gay, bisexual or any other, gender, just like a cisgender (non-trans) person.

Ever since Laumann's population wide study, more studies continue to document the prevalence of incongruity of sexual orientation in both Canada^{34,35,36} and the United States (US)^{31,37,38}. In a national probability sample of high school students in the United States from 2014, it was found that among those who were sexually active, over 60% of adolescents who exclusively have sex with the same sex identified as heterosexual³⁸. A qualitative study that interviewed subjects recruited from lesbian, gay, bisexual and transgender (LGBT) organizations also suggested that 22% of adults (28% females, 14% males) were incongruent in their sexual orientation responses³¹. Incongruity was defined to be any instances where an individual's identity, attraction and behaviour did not match one another, as shown by a few examples in Table 1 below³¹:

Table 1: Examples of Congruent and Incongruent Sexual Orientation (Not All Possible Combinations Were Displayed³¹)

	Sexual Identity	Sexual Attraction	Sexual Behaviour
Congruent Sexual Orientation	Gay / Lesbian	Same sex only	Same sex partner
	Bisexual	Same sex and opposite sex	Same sex and opposite sex partner
	Straight	Opposite sex only	Have not had sex
Incongruent Sexual Orientation	Gay / Lesbian	Same sex only	Same sex and opposite sex partner
	Gay / Lesbian	Opposite sex and same sex	Opposite sex, same sex, same sex and other sex, or

			have not had sex partner
	Bisexual	Same sex only	Opposite sex, same sex, same sex and other sex, or have not had sex partner
	Straight	Opposite sex only	Same sex partner
	Straight	No sex	Same sex, same sex and opposite sex partner

As can be seen in Table 1, there are many possible sources of discordance or incongruency in one's orientation. This heterogeneity will never be captured in questionnaires that only ask participants to identify as heterosexual, homosexual or bisexual. There could be many reasons why one might be discordant in their different dimensions of orientation measures³. It could be due to cultural values, stigma, laws, not finding the right partner, religious reasons, or even political reasons^{3,6}. As an example, an adolescent may not have developed a sexual identity yet, but they might have sex with both sexes without identifying as gay or bisexual^{6,10}. Some adults may always have adopted a heterosexual identity their whole life, in spite of having experimented with the same sex during their teenage years. On the other hand, some may have developed same sex attraction but refuse to have sex with the same sex because their culture prohibits them from doing so³⁹. As one can infer from these explanations, there are a lot of other possibilities that can explain why one's dimensions of orientation may not match another. This causes an issue in research; for example, if one wants to assess factors associated with behavioural risk factors on HIV by asking people if they identify as LGB, 60% of adolescents who have sex with the same sex would not be captured in the group.

More recent theorists have suggested that discordance in orientation dimensions might also be caused by the limited three category options (bisexual, gay / lesbian and heterosexual) that most sexual orientation questions are currently offering⁴⁰. There have been emerging studies that offer a wider variety of categories that were composed of five categories that include "mostly heterosexual" and "mostly homosexual"^{41,42}. Studies have found that the "mostly heterosexual" group is the largest non-heterosexual category, comprising of larger prevalence than all other non-heterosexual groups combined⁴⁰, while "mostly homosexual" is the smallest group across all orientation identities. These intermediate categories are particularly preferred by adolescents^{10,12}, who consider that

these best reflect their experiences, as they are often feeling in between categories¹⁰. Similar findings have been found among adults, where many participants felt that these categories were most reflective of their identities⁴². However, no current population survey on adults offers these categories^{5,43}.

From a sample recruited through Facebook in the US, when a mostly category is presented, over 30% of women and 20% of men chose an identity that is not exclusively heterosexual⁴⁰. This raises the question of prevalence of sexual minorities in the population, and if the “mostly heterosexuals” should be included as a minority at all⁴². Recent studies have started to include those who identify as “mostly heterosexuals” as a sexual minority⁴¹. However, no studies have considered those who are heterosexual on all dimensions but are “mostly” attracted to the opposite sex as a sexual minority. Furthermore, even within those who identify as “mostly heterosexuals”, there exists heterogeneity in how they reported their attraction. Not all of them reported attraction to “mostly the opposite sex”, some also reported attraction that is equal to both sexes, while others reported attraction only to the opposite sex. Some authors have suggested that these models are more aligned with a continuous distribution of sexual orientation, which has been proposed by other large scale multi nation-wide studies on sexuality⁴⁴.

2.2.2 Sexual Fluidity

There has been an emerging literature on how one’s sexual identity would change through time⁴⁵, which is referred to as sexual fluidity. While the idea is not new, this has been popularized in recent years from a ten years longitudinal study in the US that followed 79 sexual minority women, who either identified as lesbian, bisexual or unlabeled^{21,45}. At the end of the ten years period, 67% participants had changed their sexual identity at least once since the first time they were recruited and 36% of participants even changed their identity more than once within the 10 years period⁴⁵. This idea has been replicated in many studies and more works have been written on sexual fluidity^{45,46} particularly among women. Note that as researchers have discussed, this does not mean that one can choose their sexual orientation, but rather all of these result from the complex interplay of multiple environmental and biological variables, just like any other human experience²¹.

Sexual fluidity supported the newer models of identity development that replaced traditional models of sexual identity development. Traditional models proposed that sexual identity development occurred in a linear fashion, one recognized attraction to the same sex and decided to attach a sexual minority identity that is stable, unchanged and constant for the rest of their lives⁴⁷. Recent studies suggested that this is more of a recurrent process of continually reinterpreting identity, which might involve multiple shifts from one category to another at different lifepoints⁴⁸⁻⁵⁰. Given the changing norms and higher acceptance of homosexuality today, some have even proposed that many of today's adolescents no longer consider themselves as straight and prefer not to attach labels to their sexual identity¹⁹. However, how this fact impacts survey research is still unknown and mixed. One exploratory study of 2,560 Californian adolescents showed that 62% identified as straight; among non-heterosexuals, 71% identified with traditional categories of gay, lesbian or bisexual. Other non-heterosexual categories include 13% questioning, 5% queer and 8% wrote in other categories.

The idea of sexual fluidity also suggests that the idea of incongruence or discordance is actually fluid. A man who identified as straight and had only had sexual encounters with the opposite sex but had sexual attraction to both sexes would be considered incongruent. However, once he has sexual experience with another man, this man may have changed his identity to bisexual and now will be considered to have a congruent sexual orientation. Hence, both incongruency and sexual fluidity are both threats to validity and reliability to the current conceptualization of sexual orientation that perceives it as a constant unidimensional measure, which will be further discussed in Section 2.3.

2.3 Validity and Reliability Issues of Sexual Orientation Measures

2.3.1 Validity Issues with Sexual Orientation Measures

The idea of discordance among sexual orientation dimensions has posed a methodological challenge for researchers because this means sexual orientation cannot be just measured as a single unidimensional measure. In assessing risk for HIV, which has been found to be higher among sexually active gay man, asking if one is gay or straight

may not be sufficient⁵¹. If one has same sex attraction and identifies as gay but has little same sex behaviour, he would not be at a higher risk for HIV transmission compared to a heterosexual man with the same characteristics. In fact, researchers have shown that men who have sex with men but do not identify as gay were actually at higher risk for HIV compared to those who identify as gay since they tend to have riskier sexual behaviours⁵². This has been the current norm for most HIV researchers who would generally identify their population as Men who have sex with Men (MSM) to refer to their behaviour, rather than their sexual identity. This group would be composed of men from any sexual identity who have sex with the same sex⁵¹.

On the other hand, when assessing mental health outcomes such as minority stress or suicide ideation, sexual attraction might be a more relevant factor^{53–55}. This is particularly true for adolescents who might still be in the process of figuring out their sexuality since experiences of same sex attraction or even questioning one's own attraction can be a source of stress especially if they live in a culture that still prohibits same sex behaviours⁵⁴. Having a sexual minority identity, on the other hand, could indicate a time when they have reconciled their attraction and could be much less stressful for them³⁹. Similar findings were found for substance abuse among adolescents in the US, where it was found that sexual minority experiences and attractions were a much more important predictor of substance abuse than sexual identity⁵⁶. Hence sexual orientation would not be fully captured as a factor for health disparities in studies among adolescents if only identity was assessed⁶. A participant may choose to not report it or to not identify as a minority, in spite of experiencing same sex attraction.

Given all of this, one might question how much validity is compromised if one is using another measure of orientation. In spite of the incongruency, is sexual identity actually a good or at least a reasonable proxy for, say sexual behaviour?⁵⁷ If sexual identity as a proxy for sexual behaviour does not change the result by a lot and maintains the same conclusion, probably this is a minor issue. However, studies have documented how results would actually change depending on what measure of orientation was assessed, sometimes even drastically change the conclusion^{57,58}. For example, in a study that utilized data from the 2002 NSFG, women who have sex with women (WSW) were

found to have higher rates of smoking compared to women who only have sex with males⁵⁷. However, lesbian identified women do not have a different rate of smoking compared to heterosexual identified women⁵⁷. Similarly, another study that utilized the NSFG data found that “behavioural bisexuality” (i.e. having a recent sexual encounter with both men and women partner) also served as a poor proxy for bisexual identification⁵⁹. Based on self-reported past one year sexual behaviour, about 85% self-identified bisexual men and women actually exhibit heterosexual sexual behaviour (i.e. they exclusively have sex with the other sex)⁵⁹. It was suggested that if one uses self-reported sexual behaviour from the past one year to classify bisexuality, 59% to 82% of individuals who identified as bisexual or have a bisexual history would not be classified as bisexual⁵⁹. Furthermore, this type of classification on sexual behaviour also excludes those who have not had sex, since those will have sexual identities that were unclassifiable⁵⁹. Finally, a large scale Australian study based on a representative probability sample of 10,713 men and 9,134 women suggested that surveys that only ask sexual identity had a high specificity (i.e. heterosexuals are unlikely to be classified as sexual minorities), but it had a lower sensitivity (i.e. gay, lesbians and bisexual people could potentially be classified as heterosexual)^{58,60}. These findings strengthened the idea that sexual identity alone is not a good enough proxy to capture the overall heterogeneity of the various sexual orientation dimensions in the population, i.e. it is not a valid measure of risk factors for a lot of the health outcomes investigated in health studies.

Furthermore, recent studies have provided evidence that it is important to address all 3 dimensions of orientation rather than taking one measure given the purpose of the study (e.g. only asking for sexual behaviour for a study of HIV risk). A recent US study using the National Longitudinal Study of Adolescents (AddHealth) data showed that heterosexual and bisexual self-identified WSW were at higher risks for Sexually Transmitted Infections (STI) compared to lesbian identified WSW⁵¹. Another study using the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) found that those with attraction discordant to their identity had lower risk of substance use and mental health disorders compared to those who were concordant for both men and women⁶¹.

These findings illustrate that there is much heterogeneity within each of the groups; just as one should not classify all gay identified men into one category, MSM and WSW groups also have much heterogeneity. The intersections within the different categories of orientation create a more complex interplay which warrants the inclusion of all three components of orientation whenever assessing sexual orientation as a risk factor, rather than sticking to one for different purposes³⁷.

2.3.2 Validity of Sexual Identity Questions

While it was well established that discordance between different dimensions of sexual orientation exists, can we actually interpret a question that asks if one is gay, bisexual or straight as one's sexual orientation? Unlike the concept of social class which may have a more objective measure (i.e. the income that one makes), the multiple dimensions of sexual orientation out there prevent one objective measure. Researchers have shown that even physical sexual arousal measured in the laboratory does not always match to one's reported sexual attraction⁶². This raises further uncertainty on how to interpret results from these studies; can we interpret a response from a questionnaire that asks one to check a box of gay / lesbian, bisexual or straight as a sexual orientation identity? Such a question has never been explored in past studies.

One needs to consider the difference between social positions and one's own identity. Social positions are how individuals are positioned and perceived by the society. In terms of sexual orientation, society usually perceives one's sexual orientation as straight, unless one publicly declares otherwise. A female with a male partner would be perceived as heterosexual and hence holding heterosexual societal position although she may actually identify as bisexual⁶³. She may not experience the same discrimination due to her sexual orientation, but if she answers based on how she identifies, the survey research will classify her as bisexual. She will be determined to be at risk for the same discrimination as other sexual minority women who are in a relationship with women. In addition, as has been discussed, the idea of sexual fluidity indicates that sexual identity may be constantly changed and negotiated; it is context specific in time, place and situation. The same bisexual woman with a male partner may identify as a bisexual when she is in a safe context with colleagues from an LGB organization she is involved in. However, she may

refuse to use these labels when confronted with, say, a religious parent who disproves of the LGB lifestyle.

This may lead to one questioning if sexual orientation identity itself needs to be considered as a multi-dimensional concept. To fully understand the effects of sexual identity on minority stress and discrimination, one needs to also consider things such as visible outness (i.e. can one perceive them as being gay without told), outness to the family, outness to the world, internalized homophobia, gender expression, and social support^{64,65}. Currently, questions on visible outness were never explored in a population survey and hence were not discussed further in this thesis.

2.3.3 Reliability and Concordance of Sexual Orientation Items

It is clear that there are validity issues with a single item sexual orientation question; a sexual identity question is not a valid measure for identifying all sexual minorities in the population. However, what about reliability issues; would the same measure be answered in the same way measured at a different time? Furthermore, would two different sexual orientation questions be answered the same way, assuming that they intended to ask the same thing?

In a study that examined the test-retest reliability among youth from LGB organizations in the US, it was found that generally adolescents were reliable in their reports of the multiple dimensions of sexual orientation (i.e. attraction, behaviour and identity)⁶⁶. The intraclass correlation (ICC) or Kappa statistic was reported to be 0.96 for the number of life time same sex sexual partners in a three month follow up question⁶⁶. However, life-time same-sex sexual encounters did have a poorer reliability with an ICC of 0.49 for both genders⁶⁶; while reliability for same sex encounters within the past 3 months were also only moderate (males $K = 0.77$, females $K = 0.60$)⁶⁶. On the other hand, adolescents had a high reliability on reporting their specific sexual behaviours, such as oral, vaginal or anal intercourse. Given a convenience sample recruited from an LGBT organization however, it is likely that these adolescents have developed a more stable minority identity compared to the general population. Those who are still confused or questioning are

probably ones that are at higher risk for negative health outcomes; the reliability of sexual identity questions among the general population is still worth investigating.

Authors speculate that reasons for the lower reliability in reporting sexual behaviours might be due to many adolescents being confused or inconsistent in defining the term sex and what constitutes as a sexual act⁶⁶. They could recount the specific sexual acts they did, which made the measures of specific behaviours reliable, but when they were asked about any sexual behaviour, they were possibly inconsistent in defining the term sex, which led to the lower reliability. While inconsistency in defining sexual behaviours within individuals was never really explored, many studies have shown that definition of sex varies from individual to individual, which has been confirmed through studies among university students across the US, Canada and the United Kingdom (UK)⁶⁷⁻⁶⁹. Furthermore, a Canadian study also found that there is a difference within individuals for defining a sexual act and a sexual partner⁶⁸. As an example, more students define their partners in deep / tongue kissing to be a sexual partner, but very few students define deep tongue kissing to be a sexual act. This inconsistency also raised the question of how individuals would respond to questions on sexual behaviour with the same sex. If they had deep kissing with the same sex, would they report it as a sexual behaviour with the same sex? Would we need to look at their definition of sex as a behaviour or their definition of sexual partner? This has never been investigated.

There have been fewer studies that assess the test-retest reliability of sexual orientation identity questions among adults or the general population. Sexual fluidity has challenged the idea that a person can always be classified in a box labelled gay, straight or bisexual which will remain constant for the rest of their lives. While changes in one's identity may not point out a reliability problem with the questionnaire per se, this draws much needed attention to interpreting sexual orientation findings as being confined to a time period. This also raises the question whether the findings on sexual minorities would apply at different times of an individual's life. Would findings apply to anyone who had ever adopted a sexual minority identity at any point in their lives, or only to those who currently identify as a sexual minority? Similarly, this raises the question as to whether surveys should start asking people if they have ever adopted a minority identity in

addition to asking their current identity, which might also provide useful information in identifying risk factors.

One study looked at gender minority or transgender participants recruited online or in person in the US⁷⁰. They were asked to indicate their sexual attraction and sexual identity and asked if it has ever changed in their lifetime⁷⁰. About 58.2% claimed that they have changed their sexual attraction throughout their life time, which shows that fluidity is the norm, rather than the exception among gender minorities⁷⁰. An analysis was also conducted in the US using the data from the longitudinal survey National Survey of Midlife Development (MIDUS I and II)⁴⁶. Participants were recruited at ages of 25 to 74 years of age from the general population. They were asked to indicate their sexual orientation during recruitment and then they were asked again 10 years after their first completion⁴⁶. It was found that out of 2560 participants, approximately 2% changed their identity⁴⁶. They found that heterosexuals generally have the most stable identity. Among sexual minorities, similar to past findings⁴⁵, both lesbian and bisexual women have a less stable identity compared to heterosexual women, whereas for men, bisexuality is less stable than both gay and heterosexual identities.

These findings highlight the importance of asking questions of sexual identity change. While one might identify as a non-sexual minority when asked during the survey administration, they may have identified as a minority in the past and might still be at higher risk for health disparities. This was shown in a study among adolescents that used data from Add Health, Waves 3 and 4 in the US. It was found that those who showed a sexual identity change were at higher risk for depressive symptoms compared to those who were not showing identity change⁷¹. Moreover, among those who reported an identity change, those at highest risk were those who identified as heterosexuals or do not report any same sex attraction⁷¹. This means that the disparity might be higher than anticipated, given that heterosexual identity is the majority of the population.

With validity concerns over sexual orientation items and the idea of sexual fluidity, there is a need for more studies in this field to better understand the best practices for identifying sexual minorities in questionnaires and how to interpret their findings. To our

knowledge, the agreement between different questionnaires that ask the same concepts (e.g. two different questionnaires that were intended to ask sexual identity in two different ways) has never been assessed.

2.4 Health Disparities among Sexual Minorities

Many systematic reviews have documented health disparities among sexual minorities for multiple health outcomes, such as substance abuse⁷², health care access⁷³, HIV risk infection⁷⁴, mental health disorders⁷⁵, and smoking⁷⁶. As discussed earlier, it is important to note that there are heterogeneities in the effect even within these sexual minority groups. For instance, it was found that bisexual men have a lower insurance coverage compared to heterosexuals, but this difference was not found between gay and heterosexual men⁷³. A systematic review in the US found a significantly higher rate of depression among sexual minority women, but this difference was not found for men⁷⁵. These findings demonstrate that collapsing all sexual minorities under one LGB identity is not helpful and further highlights the importance for accurate identification in large scale surveys. The Fenway Institute had summarized the numerous findings on health disparities among sexual minorities in the United States, shown in Table 2⁷⁷:

Table 2: Summary Findings of Health Disparities among Sexual Minorities in the United States (all were compared to heterosexuals) ⁷⁷

LGB Community	Higher rates of tobacco use Higher rates of alcohol and drug use Higher rates of psychiatric disorders and mental health service use More likely to lack health insurance
Gay Men	Higher rates of alcohol and drug use Increased risk of HIV for men who have sex with men
Lesbians	Increased risk of being overweight or obese Lower likelihood of receiving screenings for cancer
Bisexuals	Experience more barriers to health care Higher rate of alcohol use among bisexual women More likely to experience mood or anxiety disorders
LGB Youth	More likely to be bullied and victimized Increased risk of attempted suicide Increased risk of homelessness Increased risk of substance use
LGB Older Adults	Increased Risk of Disability Increased risk of poor mental health

<p>Increased risk of smoking</p> <p>Increased risk of excessive drinking</p>
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There have been no similar systematic reviews that have been conducted on the Canadian population. However, researchers have also found some significant health disparities in the Canadian population using the CCHS data, one of the largest health surveys in Canada. Findings have mainly replicated those that were found in the US, where LGB individuals were found to have poorer health outcomes compared to their heterosexual counterparts, which is summarized in Table 3 below. One study that examines the intersection of race, gender and sexual orientation suggests that bisexual, non-white, persons with lower class standing tend to have the poorest health outcome among all intersections in Canada⁷⁸. The same study also found that there tends to a large multiplicative effect between social class and sexual orientation; poor health outcomes were largest among those who were poor and self-identify as gay or lesbian, rather than being only poor or being only gay or lesbian⁷⁸. This highlights the importance of examining different intersections in identifying factors related to health disparities, rather than looking at sexual orientation alone

Table 3: Summary Findings of Health Disparities from the CCHS Data

Gay and Bisexual Men compared to heterosexual men ^{79,80}	<p>No difference in rates of smoking</p> <p>Lower rates of obesity and lower BMI</p> <p>Higher mood and anxiety disorders</p> <p>Higher suicide ideation</p> <p>Much higher increase in STI diagnosis</p>
Bisexual identified women compared to both heterosexuals and lesbians ⁸¹	<p>Higher rates of daily smoking</p> <p>Higher rates risky drinking</p> <p>Higher rates of mood disorders</p> <p>Higher rates of STI diagnosis</p> <p>Higher rates of life time suicide ideation</p>
Bisexual individuals compared to heterosexuals ⁶⁰	Higher unmet Health Care Needs
Lesbian and Bisexual Women ⁶⁰ compared to heterosexuals	Less likely to have mammogram or Pap smear test
LGB Individuals compared to heterosexuals ^{60,80}	<p>Higher use of mental health services</p> <p>Higher reports of mood disorders</p>

2.5 Introduction to the Two Commonly Used Sexual Orientation Measures

The first population-based survey in the US that included a sexual orientation question was the Minnesota Adolescent Health Survey in 1986^{3,82}, followed by the National American Indian Adolescents Health Survey (NAIAHS) in 1990 and Minnesota Student Survey (MSS) in 1992³⁹, which all studied youths in high school. To our knowledge, the first large nation-wide health survey to include sexual orientation item was the National Longitudinal Survey of Adolescent Health (ADD Health Wave 1) in 1995^{3,83}. In Canada, the first health study that included a sexual orientation measure was the Adolescent Health Survey of British Columbia in 1992^{3,84}. From these state and provincial based studies, wider national surveys have started to include a sexual orientation measure. The CCHS from Statistics Canada started to ask sexual orientation questions since 2003⁸⁵, while NHIS from the US started to ask a question on sexual identity since 2001⁸⁶.

Currently, there is no consensus on the best way to measure sexual orientation. Different studies use their own sexual orientation questions, which also makes it difficult to compare results from study to study⁷⁷. As has been discussed, many population wide studies do not ask all 3 dimensions of orientation (i.e. identity, behaviour and attraction). Attraction is particularly thought to be irrelevant in most population surveys, although evidence has shown that this is more useful for identifying disparities in mental health outcomes, particularly among adolescents or questioning youth^{39,53,87}. Some other studies even no longer ask sexual orientation questions when assessing health disparities for risky sexual behaviours⁸⁸. As summarized in Table 4 below⁷⁷, many health population surveys generally only ask sexual identity and behaviour, or at other times, only identity:

Table 4: List of Sexual Orientation Measures Assessed in Different Population Health Surveys (Adapted from Fenway Institute, 2014) ⁷⁷

Country	Survey	Sexual Orientation	Population
The United States	National Epidemiological Survey on Alcohol and Related Conditions (NESARC)	Identity, Behaviour	Asked to individuals 20 years of age and older
	National Health and Nutrition Examination Study (NHANES)	Identity, Behaviour	14 - 69 years old

	National Health Interview Survey (NHIS)	Identity	Aged 18 and older
	National Survey of Family Growth (NSFG)	Identity, Behaviour, Attraction ⁸⁹	15 - 44 years old
	Behavioural Risk Factor Surveillance Study (BRFSS)	Identity, Behaviour	Asked for 18 - 59 years old
Canada	Canadian Community Health Survey (CCHS) ⁵ – Statistics Canada	Identity	Asked for 18 - 59 years old ⁷⁹
	BC Adolescent Health Survey ⁸	Identity, Behaviour	Asked for adolescents 12 - 18 years old
	General Social Survey (GSS) ¹⁸ – Statistics Canada	Identity	Aged 18 and older ⁹⁰

Many of these surveys also utilize measures that have not been evaluated or validated. The NHIS sexual identity question and NHANES detailed sexual behaviour questions in the US are the ones that have received reassessments since a few cognitive interview studies have been done and led to improvement in their questions^{14,15}. Many of these studies have been summarized by the SMART team under the Williams Institute, which recommends best practices in asking questions to identify gender and sexual minorities³. For the purpose of this thesis, we will be evaluating the sexual orientation measure used in Statistics Canada surveys and comparing it with the set of questions recommended by the SMART guidelines.

2.5.1 Sexual Orientation Item from Statistics Canada

The sexual orientation item developed by Statistics Canada has been used in multiple health surveys, such as CCHS and GSS. CCHS is the largest health surveys in Canada that utilizes a probability based sampling⁹¹. This makes the CCHS one of the most valid sources for identifying health patterns in the Canadian population. Probability-based sampling also allows generalization to the non-institutionalized, off-reserve Canadian population, which cannot be done through convenience sampling⁹¹. Hence, CCHS data have been utilized by various researchers to identify health disparities among different subgroups of minorities, including sexual minorities^{60,78,79,81}. However, the sexual orientation question from CCHS has been used since its first introduction in 2003 up to today with no revisions^{5,85}. The question reads as: “Do you consider yourself to be: “heterosexual (sexual relations with people of the opposite sex)”, “homosexual, that is

lesbian or gay (sexual relations with people of your own sex)”, and “bisexual (sexual relation with people of both sexes”^{5,85}. Participants have the options to answer “don’t know” or “refuse to answer”. As has been discussed in earlier sections, for some sexual minorities, behaviour, identity and attraction do not match one or the other. This may cause difficulties in responding for some participants since these identities were defined behaviourally. Furthermore, as discussed, conclusions might change depending on which dimensions of orientation that were assessed and it is unclear what exactly this measure from the CCHS is capturing (i.e. is it behaviour, identity or something else). Hence, there are many potential limitations from this survey, and yet there are no published materials that have evaluated this survey question.

This is concerning, given that this is a source of many major findings of health disparities among sexual minorities in Canada, as summarized in Table 3 in the previous section. Some of these results may not actually be interpretable. For example, one of the studies found bisexual women have poorer health outcomes compared to heterosexual and lesbian women. Previous studies have shown that there is a high proportion of women who have sex with both sexes in their life time, and many do not identify as bisexual. It seems reasonable to infer that many of these bisexual identified women may not necessarily have more sex partners than their lesbians or heterosexual counterparts and none of this heterogeneity was accounted for. As discussed in the previous section, given that there was recent evidence to suggest women with discordant orientation have higher rates of substance abuse³², there seems to be a much more complex interplay that exists rather than what was portrayed. However, this cannot be found from the current CCHS data. A similar argument can be made for all the other findings on health disparities among sexual minorities based on the CCHS data.

2.5.2 Sexual Orientation Item from SMART Team

The SMART Guidelines were developed by a research consensus team in the US, originated from the Williams Institute at the University of California Los Angeles (UCLA). It was designed in order to help researchers to conduct sexual orientation studies, especially for population-based surveys. It includes four measures, one for sexual identity and attraction, two for sexual behaviours, which is more aligned with previous

research that suggests the discordance of the three measures. This questionnaire has been validated across multiple subpopulations in the US but never been tested in Canada³.

The recommended item for sexual identity from the SMART Guidelines asks “Do you consider yourself to be?” and provide participants with 3 options, which are “heterosexual or straight”, “gay or lesbian”, and “bisexual”³. Their guidelines do not recommend the option “don’t know” because it is likely that responses to these options are likely to be discarded and leads to reduced sample size. For consistency with the Statistics Canada measure, we decided to add such option, which was also preferred in most surveys⁹². The guide recommended to split sexual behaviour into two questions, life time and past year behaviour, which read as: “In your life time, who have you had sex with?”, and “In the past 12 months, who have you had sex with?”. For both questions, they will be given the options: “men only”, “women only”, “both men and women”, and “I have not had sex”. Finally, the sexual attraction question was suggested to be: “People are different in their sexual attraction to other people. Which best describes your feelings? Are you ...?” And the options will be given as “Only attracted to females”, “Mostly attracted to females”, “Equally attracted to females and males”, “Mostly attracted to males”, “Only attracted to males” and “Not sure”³.

2.6 Results from Past Cognitive Interview Studies

There have been very few studies conducted to evaluate the different measures of sexual orientation used in population wide surveys. While there had been a few early interview studies conducted on improving different survey questionnaires on sexual orientation, they were all focus groups targeted to specific groups of sexual minorities^{10–13}. There had been cognitive interview studies conducted to compare the two traditional measures of orientation¹¹, the Klein Grid Orientation³⁰ and the Kinsey Scale Measure²⁸. However, as discussed previously, these two measures were rarely used in population health surveys due to their complexity^{24,26}. Furthermore, this interview study was still conducted only among minorities¹¹. Hence, there is still no evidence if all of the available measures work in distinguishing non-minorities from minorities accurately.

To our knowledge, there have been no cognitive interviews of sexual orientation questionnaire items in the Canadian population. While there have been a few interviews on the problems experienced by sexual minorities in Canada^{93,94}, there have been very few studies done to address if the sexual orientation measures used works for the general Canadian population that encompasses both sexual minorities and non-minorities alike.

A few cognitive interview studies had been done in the US population. Most of this work was done for the sexual behaviour and identity questions used in NHANES¹⁴ and the sexual identity question used in the NHIS¹⁵, which are both very similar. The studies conducted cognitive interviews on the comprehension of sexual identities and sexual behaviours questions, which included seven testing from 2001 to 2011, to a combined total of 386 participants¹⁵. On the latest cognitive interviews in 2011 regarding the NHIS sexual identity question, they included participants from a wide variety of demographic backgrounds on gender, education, sexual identity, language, age, and ethnicity¹⁵.

This study gave a lot of insights on asking sexual orientation questions in the general population. They found that their measures did not work as well with people from lower education backgrounds¹⁵. This study also found that among cisgender heterosexual participants with lower education, many of them were not familiar with the terms commonly used in sexual orientation surveys (such as bisexual or heterosexual)¹⁵. Even many of those who knew what the terms meant were still unsure if their understanding was right, and this even occurs for a small number of sexual minorities¹⁵. Their results revealed that a few heterosexually identified participants selected bisexual as an option because they thought bisexual means straight. They decided to change the term heterosexual to “straight, that is not gay”, which was more understood among participants, even to those who do use the term heterosexual¹⁵. Hence these findings demonstrate that simply adding categories that will fit nearly every individual (such as pansexual, asexual, skoliosexual) will not solve the problem either. Just like the term heterosexual, this may lead to higher misclassification, since many participants who are not familiar with the terminologies might get confused and pick categories they actually do not identify with.

Similarly, evidence was found that many prefer the term gay or lesbian compared to homosexual¹⁵. Many claimed that the term homosexual has a negative connotation; it is an overly clinical term and unlike heterosexual, it is seen in a pejorative light^{15,95}. This term is still used by many surveys, including the CCHS conducted by Statistics Canada⁵.

The cognitive interview study also suggested that some participants whose behaviour and identity were incongruent assumed that the identity questions were referring to their behaviours or attractions¹⁵. This especially occurs since NHIS does not ask separate questions on the gender of their sexual partners. Such confusion would be problematic since this might mean their results may not necessarily be interpretable as the individual's sexual identity. For example, some bisexually identified participants who do not sleep with both men and women will choose the option that matches their behaviour rather than bisexual¹⁵. Even though the option of "something else" was provided in the NHIS, a respondent who identified as queer selected the option bisexual because she thought that corresponded better with her behaviour, and assumed that the question was asking about her behaviour. One participant even claimed that the definition of bisexual varies, and to him, being bisexual means that one is attracted to men 50% of the time, and attracted to women 50% of the time¹⁵. This does not apply to him, although he does sleep with both men and women, hence he does not consider himself bisexual¹⁵. Hence, this finding also illustrates that even when participants understand the different terms being used, why one decides to choose one category over the other varies from individual to individual and results should not be taken at face value.

Past cognitive interviews also suggested to add the options of both "something else" and "don't know" to account for those who do not identify with any of the categories¹⁴. An "other category" or not sure had generally been recommended by most survey designs principles in general⁹², but other than the NHIS team that utilized results from this interview¹⁵, other sexual orientation questions, including the Statistics Canada and SMART Guide do not adhere to this. This may have been because when the option something else was included, a large number of participants chose this option, and ended up being discarded. In a 2008 study from the NSFG data women who chose the identity "something else" was the largest among those who chose the non-heterosexual option⁵⁷.

The most recent interview by NHIS actually tested their “something else” response option and it generally does not lead to confusion among most participants¹⁵. The report also recommended that to further understand participants who selected “something else” or “don’t know”, they should be followed up with more questions¹⁵. If this was not clarified, researchers will typically assume that participants are not straight and they identify with another category rather than ones that were presented. However, this assumption has been proven to be not true from the cognitive interview results¹⁵. For example, some transgender participants would select the option “*something else*” because of their transgender identity, rather than because their sexual identity was not listed as an option¹⁵. The list of follow up questions in the NHIS is shown in Figure 1 below, which will allow for a more accurate response and reclassification into the proper category¹⁵.

Figure 1 : Follow up Questions to “Don’t Know” or “Something Else” Responses¹⁵

Those who answered “don’t know”:

You did not enter an answer for this question. That is because you:

- ☐ You don’t understand the words
- ☐ You understand the words, but you have not figured out your sexuality or are in the process of figuring it out
- ☐ You mean something else

Those who answered “something else”:

By something else, do you mean that...

- ☐ You are not straight, but identify with another label such as queer, trisexual, omnisexual or pan-sexual)
- ☐ You are transgender, transsexual or gender variant
- ☐ You have not figured out your sexuality or in the process of figuring it out
- ☐ You do not think of yourself as having sexuality
- ☐ You do not use labels to identify yourself
- ☐ You made a mistake and did not mean to pick this answer
- ☐ You mean something else*

**To those who answered something else,*

What do you mean by something else? Please type in your answer _____

2.7 Quality Assurance and Patterns of Missingness

Having undergone a few revisions based on their cognitive interviews, NHIS survey items on sexual orientation have received a few quality assessments to evaluate whether

or not their measures truly work as expected in the general population. Although not perfect, generally their revisions have led to improved sexual orientation measures that work well in the general American population¹⁶. Their evaluation also complements the results obtained from their cognitive interviews, where similar problematic areas were observed based on the quantitative data obtained. They also observed any patterns of missing data from certain subgroups, which will be discussed further in the next section.

2.7.1 Quality Assessments from NHIS

Quality assessment of the 2013 NHIS survey has generally shown that their latest revisions seem to work reasonably well for the American population¹⁶. Out of 33,785 adults who responded, 0.6% refused to answer, 0.2% answered “something else” and 0.4% answered “I don’t know the answer”. As discussed earlier, this latest version decided to follow up on those who answered “something else” or “I don’t know the answer”. From the follow up questions, very small number (n = 5) of sexual minorities answered that they identify with other labels¹⁶. On the other hand, there are more responses from individuals who claimed that they do not understand the questions (n = 45), or in the process of figuring out their sexuality (n = 49), and those who do not use a label to identify themselves (n = 26)¹⁶. This shows that rather than adding new categories to accommodate everyone and potentially leads to higher confusion, it is more important to accommodate these responses of those who do not understand these categories or have not decided on an identity. To accommodate for those who are still unsure of their identity, sexual attraction can be used, which has been shown to be preferred among adolescents who are still in the process of figuring their sexual identity¹⁰. Since NHIS sexual orientation questions were asked to individuals of 18 years old or older, it is unknown if results would hold for adolescents.

2.7.2 Missing Responses or Refused to Answer Sexual Orientation Questions

There are close to no published studies that look at missing responses or those who refuse to answer sexual orientation questions on population surveys in Canada. However, an evaluation has been done across multiple adolescent surveys among high school students

in both the US and Canada³⁹. They found that immigrants, ethnic minorities, younger students, students whose English is their second language, and students with learning disabilities were more likely to skip sexual orientation questions or select “unsure”³⁹. Whether or not these findings hold true for the general adult Canadians is unknown.

There are more studies in the US that look at missingness patterns among other subgroups. It was once thought that older adults would generally skip a sexual orientation question and surveys such as the CCHS deliberately put an upper limit of 59 years old or sometimes 65 years old^{20,79}. However, this idea has been disproven. While older adults do have a higher non response compared to younger adults, this rate has been decreasing over time and the gap for the non-response between younger and older adults has narrowed⁹⁶. It was also found that this non-response rate was no more significant than for other variables such as income, education or race and ethnicity⁹⁶; those who skipped the question also tend to be the ones who skipped these other questions. This suggests that there is no reason to have an age restriction in asking sexual orientation questions and no reason to eliminate a question on sexual orientation in population wide surveys⁹⁶.

In the US, findings had suggested that the overall trend of non-response has declined over time. Based on the California Health Interview Survey (CHIS) data, it was found that sexual orientation non response among Asians and Hispanics was two to four times higher than Whites, Blacks and multi race participants in the 2003 survey, but this difference was no longer statistically significant in 2011⁹⁷. Furthermore, their findings also suggested that interviews conducted in Spanish had higher odds of non-response compared to English language, controlling for demographics and survey cycle⁹⁷. Similarly, studies using NHIS data found that interviews completed in Spanish produced higher non response to sexual orientation compared to those completed in English¹⁶.

In the evaluation of combined NHANES data from 2001-2008, it was found that there was a significant difference in the rates of missing data between those who did not finish high school (4%) compared to those who had an education level higher than high school (0.4%)⁹⁸. More recent studies with the 2013 NHIS survey replicated this finding, although the difference is now a lot less pronounced (1.36% vs. 0.81%)¹⁶. The refusal

rates for these questions have been overall decreasing for many of these different subgroups however, the missingness patterns are still systematic⁹⁸. They are not missing completely at random, where statistically it can be ignored⁹⁹, but rather it shows a systematic missing response that needs to be remedied⁹⁸. Systematic underreporting could lead to biased results on a population health survey, especially given that a recent unpublished data reported that up to 30% MSM indicate that they were unwilling to disclose their sexual orientation on a government related survey¹⁰⁰.

2.8 Understanding of Sexual Orientation among Different Subgroups

As has been discussed throughout the thesis, research has shown that sexual orientation questions work differently depending on participants' demographic backgrounds; for example, older individuals and non-White (such as Asian and Latino) participants were more likely to skip these questions and some of the terms were not well understood by participants from lower education background. In designing a survey that will work for all members of the population, it is important to consider how these questions work for different intersections of various demographic characteristics of participants^{14,15,101}. As suggested by intersectionality theory, different societal positions interact differently together and cannot be separated as different, distinct factors⁶³. It was argued that factors such as gender, class, race or sexuality were analytically inseparable and we cannot disaggregate to study individuals' experiences by simply looking at these entities separately²². These different demographic factors work concurrently to shape one's experience and understanding of various concepts in the society. Given this, in understanding how sexual orientation measures work in the population, it is essential to consider the multiple demographic intersections that exist in the population. It is almost impossible to understand how one's immigration status alone would influence one's understanding of sexual orientation questions without considering other intersections that the immigrant is experiencing such as culture, age, ethnicity, and gender. Two identical Asian immigrant males would have a very different understanding of sexual orientation if say, one of them moved to Canada when he was 60 years old while the other moved

when he was 18 years old. The following section discusses how various demographic characteristics influence one's understanding of sexual orientation.

2.8.1 Age

As seen in Table 4, the range of age varies for different national population surveys, although usually participants are at least 18 years old, with some studies putting an upper age restriction⁷⁹. More specific population studies such as the BC Adolescent Health Surveys, which surveyed almost 30,000 high school students in British Columbia (BC)⁸ have asked these questions to individuals as young as 12 years old. Their latest survey found that three quarters of BC youths have not had sex, either oral or intercourse⁸. The report even showed that younger youth aged 13 or younger were actually more likely to exclusively have same sex partners compared to the overall youth (8% vs. 2%, among those who have had intercourse)⁸. This might be due to cohort effects, where younger children are exposed to a higher acceptance of same sex behaviours or a homosocial environment. The proportion of all older adults who have not had sex is unknown, although a US study from the NSFG survey have shown that 11.1% and 7.7% non-homosexual (heterosexual, bisexual, or other) identified men and women aged 25 – 44 years old have not had heterosexual sex¹⁰². They also reported that these individuals tend to be more religious and avoid alcohol consumption¹⁰². While they may have had sex with the same sex, there seem to be a considerable number of adults who have not had sex. This will create problems since this means many adolescents and some of these adults would be unable to answer the limiting questions from the CCHS, which do not have the option “I have not had sex”.

In terms of how to best ask these questions, there were more cognitive interview studies conducted with LGBT youth in the US, particularly adolescents than with any other age group^{10,12}. This is because many thought that they are still developing their sexual identity and identification of factors related to health disparities is best found at an early age. Generally, cognitive interview studies in the US with sexual minority youth suggested that attraction was the most salient dimension compared to identity or behaviour¹². This is because many adolescents have not had sex and have not committed to a particular sexual identity yet¹²; some are still questioning or are in the process of

figuring it out. However, they are able to identify who they are attracted to and hence are able to report their sexual attraction as a defining feature of their sexual orientation¹². It was also found that adolescents prefer to have a sexual attraction component in sexual orientation questions since they feel safer to report a minority attraction rather than reporting a minority sexual identity^{10,12,20}. They are also more likely to report a minority sexual behaviour rather than a sexual minority identity^{10,39}. The findings were also confirmed in a study that compare eight different surveys administered to high school adolescents across Canada and the US³⁹. It was found that sexual behaviour questions had the lowest non response and a sexual attraction question seems to be the best choice in measuring sexual orientation for adolescents, similar to other findings from cognitive interviews³⁹. This suggests there may be possible underestimation of sexual minority youth from national surveys.

In another Canadian study conducted among Quebec youth, it was reported that approximately 12% of adolescents reported a non-heterosexual response for at least one of the sexual orientation dimensions (attraction, behaviour and identity)³⁶. Furthermore, about 43% of students who reported same sex behaviours reported a heterosexual identity³⁶. Authors speculated that other than the typical reasons of culture and fear of disclosure, a high discordance among adolescents was due to attraction preceding identity. Many adolescents may first recognize same sex attraction first, and then develop a non-heterosexual identity later, or they may not have found a same sex partner³⁶.

Fewer studies looked at older LGB adults. Recent findings and a systematic review on the topic have suggested that contrary to popular beliefs, many older LGBT adults are actually well adjusted and live with positive social and psychological functioning, some of which are even better than their heterosexual counterparts¹⁰³. However, just like other marginalized groups, there were still studies that document the poor treatment that elderly LGBT individuals have received¹⁰⁴. Growing up in a more conservative society, many met in secret, were forced to deny their love or deny their identity in their younger years¹⁰⁴. Whether or not this denial will lead to concealment during the older age and reduced likelihood of reporting a minority identity is unknown. It is also possible that studies are more likely to reach those who are well adjusted and those who were isolated

remain unreachable. Hence, the estimates of older LGBT adults at the population level might be also conservative.

There are not many studies that specifically look at older individuals' (of 65 years of age or older) perception of sexual orientation. The NHIS cognitive interview that interviewed all Americans from multiple demographics did include participants above 65 years old, although no specific findings on these groups were discussed, which might suggest there was no notable difference in this population¹⁵. Furthermore, as discussed earlier, missing responses among older adults in sexual orientation questions have been declining and are no more significant than questions on income. This suggests that older adults should not be excluded from population health surveys that include sexual orientation questions.

2.8.2 Ethnicities, Immigration Status, and Language

It is generally known that many societies are still unwelcoming of sexual minorities. In many South American and Latin American cultures where Christian influence is still dominant, societies are still patriarchal and heteronormative (i.e. the assumption that everybody is heterosexual¹⁰⁵); any deviation from this would be deemed unnatural¹⁰⁶. Even in countries where same sex marriages are recognized, acceptance still differs by culture. In South Africa, women to women marriage were not seen as lesbians, even if they consummate the marriage with sexual acts. They might get married for different reasons such as because the woman is childless or is in the higher power. The marriage was also still tied to gender roles, where one woman becomes the “husband” or “father figure” and another becomes the wife¹⁰⁶. This raises the question if immigrants from such cultural backgrounds would perceive sexuality in the same way. It also questions if these married lesbian women would identify as lesbians at all in a survey question.

The few studies that looked at immigrants in Canada found that many non LGBT sexual minorities were still tied to their conservative ideas from their home country. A qualitative study team interviewed Iranian immigrant adults in Canada and found that many of them feel that some Canadian values are a threat to their traditional Muslim values¹⁰⁷. It was found that they rejected the Canadian values such as easy access to divorce, social interactions between opposite genders in public and permissive attitudes

on sexuality among adolescents¹⁰⁷. In another study that assessed the effectiveness of a workshop intended to challenge homophobia and heterosexism among Hong Kong immigrant parents in Toronto¹⁰⁸, it was found that although the workshop helped many of them to challenge their heterosexist ideas, some were not convinced, and continued to think that homosexuality is abnormal and is bad for the society¹⁰⁸. These might lead to higher non-responses, confusion, or refusals in answering sexual orientation questions among these communities, which is worth investigating.

There is little published literature on the experiences of sexual minority immigrants in Canada, which presumably might hold a unique perception of sexual orientation. In a study using focus group among first and second generation Asian immigrant MSM in Vancouver, many participants claimed that they have experienced rejection from their ethnic community due to strong religious conservative beliefs, due to the stereotypes of being gay (such as having AIDS), or due to sex being seen as taboo¹⁰⁹. A few focus groups with LGBT youth newcomers in the Greater Toronto Area (GTA) also confirmed these findings⁹³. This study included 70 youth aged 14-29 year old who were newcomers from all around the world, expressed a wide range of orientation dimensions, and had statuses of either student visa, immigrant, refugee or refugee claimant. Many of them faced oppression from both Canadians and their ethnic community, although generally many would claim that homophobia in Canada is much less prominent compared to in their home country⁹³. This is important to address since immigrants typically find social support from their ethnic community, but MSM immigrants might be unable to find support from their ethnic groups and rather find support from the gay community¹⁰⁹. Refugees also claimed that it is difficult to prove their sexual orientation during refugee claimant hearings⁹³. Judges told them they did not appear to be gay, especially for Black men who were typically stereotyped as being tough and masculine.

These findings suggest that there seem to be unique challenges that sexual minority immigrants face. Given oppression in home countries, would they be honest in a more welcoming society towards sexual minorities in Canada, or retain their fear and be less willing to disclose their orientation? As discussed, they also still may have fear from their ethnic community in Canada, which still pertain the attitudes of individuals from their

home country. How these two opposing ideas factor into their own perception of sexuality has never been studied.

There are fewer studies on how separate ethnic communities (irrespective of immigration status) would influence the perception of sexual orientation. As discussed earlier, based on the NHIS data in the US, there were higher non responses among ethnic minorities (such as African American and Asian American). It was also found that Black and Latino men are less likely to report a sexual identity minority identity due to their culture being more stigmatizing towards gay men and exerting greater pressure to conform to masculinity^{110,52}. No similar studies have been found in Canada; although there could be a similar underreporting among these communities.

In addition, understanding of orientation also seems to differ by language. Based on the cognitive interviews by the NHIS, not only did interviews conducted in Spanish result in higher nonresponse¹⁶, Spanish-language participants also held different ideas on these concepts, and may require different translations. For example, while the term straight is preferred to the term heterosexual among the lower educated English speakers, eliminating the word heterosexual in the Spanish translation actually causes more problems. Since there is no equivalent of the term straight in the Spanish language, the translation becomes “*no es gay*” (not gay) which was found to be confusing among participants¹⁵. They ended up looking for other terms, some either chose “bisexuals” or “others”, which leads to misclassification¹⁵. To our knowledge, since no Canadian studies have compared how sexual orientation responses are affected by language, it is not known if there are differences in the response rates between those interviewed in French or in English, nor if Francophones have a different understanding of sexual orientation when they are interviewed in English.

2.8.3 Religion

To our knowledge, there have been no studies that examined non response based on religion among population health surveys. This is perhaps expected because most population health studies do not ask for religion⁵. However, since these questions will be

asked to all members of the population, we need to ensure that this measure will work for all population subgroups, including those from different religious backgrounds.

One study in the US found that Conservative Protestant is the denomination with the most homophobic attitude among university students, followed by Moderate Protestants and Catholic, Liberal Protestants and Non affiliated¹¹¹. Similarly, as expected, religious service attendance also predicted homophobic attitudes¹¹¹. Homophobia may not change one's understanding of sexual orientation questionnaires however, these findings are worth noting and worth investigating if non-response or misunderstanding becomes likely to occur for more religious subjects. This has been found among high school students in the US. Based on the Add Health data that involve 20,000 students from grade 7 to 12, it was found that religious students are less likely to report same sex attraction¹¹², which may have been the result of underreporting due to social desirability.

One might make the case that this might be less likely to occur due to higher acceptance of sexual minorities today, but results are still mixed. Recent surveys have shown that homophobia due to religious belief is declining, 85% of self-identified young U.S Catholics of age 18 – 29 years of age are overwhelmingly accepting of homosexuality¹¹³. Other studies, such as one longitudinal study in Belgium showed that homophobic attitudes generally do not change from adolescence to adulthood. The difference actually became more polarized in a three years longitudinal study from 18 years old to 21 years old¹¹⁴. Those who were more accepting of homosexuality at the beginning of the study became even more accepting, while those who were unaccepting became even more unaccepting¹¹⁴. Hence, the homophobic attitude still persists in across many different groups, in spite of an overall higher acceptance.

No Canadian studies to our knowledge have looked at the relationship between religiosity and how one responds to sexual orientation questions. However, a few studies have looked at attitudes of sexuality among religious groups. A study that looks at the definitions of sexual abstinence and having sex among Canadian university students found that male students who were sexually conservative and are more involved in their religion were more likely to define abstinence as not having a bidirectional genital

stimulation between two people⁶⁹. They were less likely to define no genital stimulation or no self-stimulation as sexual abstinence⁶⁹. Similarly to the discussion in Section 2.3.3, this highlights the importance of considering the varying definition of sexual behaviours when designing these questions.

Finally, very little has been written on the perception of sexual orientation among Muslims, although literature does claim that their teachings are very restrictive on the union of the same sexes. There exists segregation between the sexes, where very few interaction between the opposite sexes were permitted in the Muslim teachings¹¹⁵. However, the same restrictions had caused many more activities among the same sex. This was found from Muslim boarding schools in Indonesia, where many Muslim women have same sex relations with one another; among men, students and priests were also found to have sex with one another in these schools^{115,116}. These findings are relevant to know and raise the question whether Muslim participants would even report these same sex behaviours, even if they do not report same sex identity. A qualitative study among gay Muslim men in Britain reported participants felt disclosure was very dangerous and threatening to their identity, which might alter their responses to these surveys¹¹⁷. They reported that there is a transition experience from a straight to a gay identity, which is typically marked by contact with a gay white male¹¹⁷.

2.8.4 Education, Socioeconomic Status and Geographic Region

Results on education and its relationship with sexual orientation reporting have been mixed. To our knowledge, there had been no research conducted on the difference in response rates or understanding of sexual orientation based on geographic regions in Canada. Nor has there been any research on the association between income and education on response rates of sexual orientation questions in Canada. Similarly, there are few studies that look at differences in response rates between states in the US.

Using the data from National Surveys of Sexual Attitudes and Lifestyles (Natsal), a large population survey in the United Kingdom (UK), it was found that individuals with higher education were actually more likely to report same sex attraction or same sex behaviours¹¹⁸. It was generally thought education made people to be more liberal, more

open towards non exclusivity within marriage¹¹⁸, and hence more likely to be honest in their report or even more likely to be open to same sex experiences and act on same sex attraction⁵⁸. A study in Australia that utilized a nation-wide probability sample also confirmed this finding. Higher education, higher income, and living in urban areas were significantly associated with higher reporting of non-heterosexual sexual attraction, identity and experiences for both men and women, with identity showing the largest association⁵⁸. Authors also speculate that it is arguable that individuals with minority attraction and identities were more likely to move to larger cities and urban areas⁵⁸.

However, the findings on the association of education with higher reported frequency of sexual minority statuses were not confirmed across all studies. The data from NSFG in the US actually suggested otherwise, while no difference in education was found between gay and heterosexual men, it was found that women of 22 – 44 years of age with bachelor's education or higher were less likely to report same sex partners compared to those with lower education (9.9% vs. 14%)¹¹⁹. In 2000, a study in the US also reported a unique interaction between race and education⁵². While higher education increases disclosure among White men, higher education actually creates less disclosure among Black men¹²⁰. It was thought that the higher stigma towards gay men in the Black community was elevated for educated Black men¹²⁰. It is unknown if this was still the case today among the Black community, or if this holds in Canada.

2.8.5 Gender

Literature has suggested that sexual orientation identities become complicated for trans people. Generally, transgender individuals were known to have difficulty in selecting a response to the traditional categories (heterosexual, homosexual or bisexual) because they were confused if they should answer based on their identified gender or biological sex^{10,15}. A recent online study of transgender participants also found that they are more likely to endorse the non-traditional categories of sexual orientation such as pansexual and queer¹²¹. Furthermore, they were also more likely to have a change in sexual identity, with an average of 2.05 identities in the past that were different from their current identity¹²¹. Past identities for trans participants were actually more likely to be traditional categories such as heterosexual, bisexual, gay and lesbian¹²¹.

This also illustrates how including the definition of each category may not help (e.g. CCHS defines heterosexual as “having sex with the opposite sex”) since it will still cause ambiguity for trans participants. This could raise even more problems for those who are genderqueer or non-binary, those who do not identify with either gender. How should they define the opposite sex or the same sex? The issue is not limited to trans individuals but also to cisgender individuals. For those who have had sex with trans individuals or are attracted to non-binary or trans individuals (who call themselves skoliosexual), they would not have the option to indicate who they are attracted to. Qualitative studies have also shown that for some individuals (including cisgender), gender does not matter for their attraction (who call themselves “pansexual”). For these individuals, they believe what matters more is compatibility rather than gender¹²². Some discussed that it is more important about being attracted to masculinity, femininity or having a “dominant” or “submissive” partner, which will never be captured in the current surveys¹²². As has been discussed previously, very few participants needed the category of “something else” however, this could also be argued because trans participants were underrepresented in most population health surveys. The majority of present day surveys still ask a single item sex and gender question, which refers to cisnormativity, the assumption that everybody is cisgender. One’s biological sex is always assumed to match their gender identity, which is often not the case for trans participants^{123,124}.

For cisgender participants, most consistent research has been women are generally more accepting of homosexuality compared to men^{125,126}. This was also supported by the idea that heterosexual women themselves also tend to be more likely to explore same sex relationships and report attraction that is not exclusive to one sex compared to men⁵⁵. It has been generally found that there are more bisexual women than lesbian women and more gay men than bisexual men^{45,55}. This also ties into the idea of fluidity where past studies have found women tend to have a more fluid sexual identity than men, although this result is still debatable and not always confirmed by all studies.

2.9 Current Study

As has been discussed, population surveys such as the CCHS are the only data source that is able to produce an accurate, unbiased estimate of health patterns in Canada. However,

there are still many limitations in the literature on the best ways to identify sexual minorities in the population and to interpret results from the current measures available. There has not been a clear literature on how different socio demographic groups within the Canadian population comprehend these sexual orientation questions. A survey evaluation should be done to ensure that quality data that will be obtained from asking these questions. This will improve the accuracy of the responses obtained, generate responses that classifiable and improve understanding on how to interpret findings based on the current measures of sexual orientation.

To evaluate surveys, both quantitative and qualitative assessments can be done. If the single item Statistics Canada question is to be used, is it sensitive and specific enough to capture all sexual minorities by the broadest definition? By their life time behaviour? By 12 months behaviour? By their attraction? Are participants' responses to this single question concordant with how they respond the multi part question from SMART Guide? These analyses will allow us to quantitatively understand the strengths and limitations of this single question in the Canadian population, and better understand how to interpret findings from these data sets.

Response rates are generally an indicator of the effectiveness and quality of a survey data. "Don't know" and skip are unclassifiable responses, which are signs of problems with the question. If the proportions of "don't know" and skip responses are non-zero, we may need to understand if these are just random differences or if there is systematic missingness from certain socio demographics. Qualitatively, one also needs to cross check if their responses were accurate and if they understand the questions in its intended meaning. Finally, where these responses that were misclassified and unclassifiable occurred, we want to understand the reasons and for which groups do these misclassification tend to occur. A mixed methods study that involves both quantitative and qualitative analyses will help to answer current question. Hence, the current study was conducted with methodology as discussed in Chapter 3.

3 METHODOLOGY

This chapter will give an overview of the methodology used in this study, which includes study design, sampling, recruitment strategies, measures used in the study and data analysis strategies.

3.1 Procedure and Sampling Strategy

Data collection in the “Improving Health Research” project spanned approximately 6 months, from October 2015 to March 2016. This is a cross-sectional mixed methods study with two stages to the sampling, an online survey and an interview, as shown in Figure 2 at the end of this section.

3.1.1 Recruitment

To allow generalizability to Canadians who could potentially be responding to CCHS surveys, our target population is any resident of Canada (regardless of citizenship status) of 14 years of age or older with an adequate ability to read English. In order to understand if different groups understand the questions in a similar fashion, we wish to reach Canadians with a wide range of demographic variation for the interview portion of the study. Since certain groups are difficult to reach, participants were recruited through convenience sampling. Initially, the team (JB, AS and CD) agreed to use Facebook ads, due to its customization feature which can target specific demographic groups¹²⁷. It was also shown to be successful in recruiting a large number of participants online, including MSM population^{40,128,129}. However, in the current study, very few participants were reached using this strategy. Hence, an electronic snowball sampling that originated from the study team’s network (GB, JB, AS and CD) was also utilized for recruitment. To recruit groups that are difficult to reach, we also contacted multiple organizations, Facebook groups, and different listservs that include potential groups of interests (such as LGBT groups, immigrants, etc) to help spread our survey. Posters used for recruitment to different organizations and email invitation can be found in Appendix A and Appendix B respectively.

3.1.2 Sampling for Online Survey

Participants completed the survey online; screenshots of the pages that participants viewed as they navigated through the survey can be found in Appendix C. The first page gave a small description of the study, which then directed them to the Letter of Information (LOI), as found in Appendix D. Participants were then asked to click on a checkbox to provide their consent to participate. Once explicit consent was given, participants then completed the questionnaires, which took approximately 5 to 10 minutes. They were asked to complete all demographic questions and one out of the two sets of questions on sex / gender, sexual orientation and race / ethnicity. The set of questions that participants received was randomized, however, they could only receive either Set A (which includes the sexual orientation question from Statistics Canada) or Set B (which includes the sexual orientation questions from SMART Guide), as shown in Table 5 below. Participants could skip any questions that they did not wish to answer. If they skipped the age or postal code questions, they were asked to confirm that they were 14 years of age or older and lived in Canada. At the end of the survey, participants were given the option to provide their contact information. They were informed that they could either be followed up with some more additional questions or be interviewed. Participants were allowed to submit their responses without providing their contact information.

Table 5: Six Items Evaluated in Current Study (Thesis only Focuses on Sexual Orientation Items, which are in bold)

SET A	<ol style="list-style-type: none"> 1. a multidimensional measure of sex, gender and transgender questionnaire used in the Ontario Health Study (OHS)^{130,124}, developed by PI, GB. 2. a single sexual orientation item questionnaire used in Statistics Canada surveys⁵ 3. a single item question that asks if one is a treated or perceived as a person of color, which are used in many health studies in Ontario
SET B	<ol style="list-style-type: none"> 1. two step measure for gender identity developed by a team in the US¹³¹ 2. a multidimensional sexual orientation measure recommended by the SMART team in the US³. 3. a single item question that asks if one is a member of visible minority groups.

To avoid priming effects, at least one week after they completed the survey, participants were asked to complete the other set of questions that they did not receive (either Set A or Set B) within the next two weeks. Those who were interviewed were asked to complete these questions in the beginning of their scheduled interview, which also took place within the next two weeks. No compensation was given to participants who completed the online survey.

3.1.3 Sampling for Semi-Structured Cognitive Interviews

Maximum demographic variation sampling from those who completed the online survey was used to select interview participants¹³². This is to ensure that the question works for the majority of the demographic subgroups in Canada. Initially, 90 people with maximum variation for variables such as ethnicity, linguistic background, religion, religiosity, trans status, sexual orientation, gender, age, geographic location, and education as shown in Table 6 were targeted. Selected participants were invited to schedule an interview with either JB or myself within one to three weeks. They were informed that should they wish to only complete the follow up questions rather than the interview, they may do so.

Due to time constraints and the fact that we felt saturation from the qualitative interviews had been reached, we recruited 79 participants for the cognitive interviews. The actual demographic for participants in the interviews can be found in Section 4.1.1

Table 6: Targeted Number of Interviewed Participants from Each Subgroups

Characteristic	Minimum Number of Participants
Transgender and LGB status	<ul style="list-style-type: none"> • 30 trans participants (of all orientations) • 30 LGB cisgender participants • 30 cisgender heterosexual participants
Age	10 age 14-17 10 age 18-24 10 age 25-34 10 age 35-44 10 age 45-54 10 age 55-64 10 age 65+
Geographical variation	10 from Maritimes and Newfoundland/Labrador 10 from Quebec 10 from Ontario

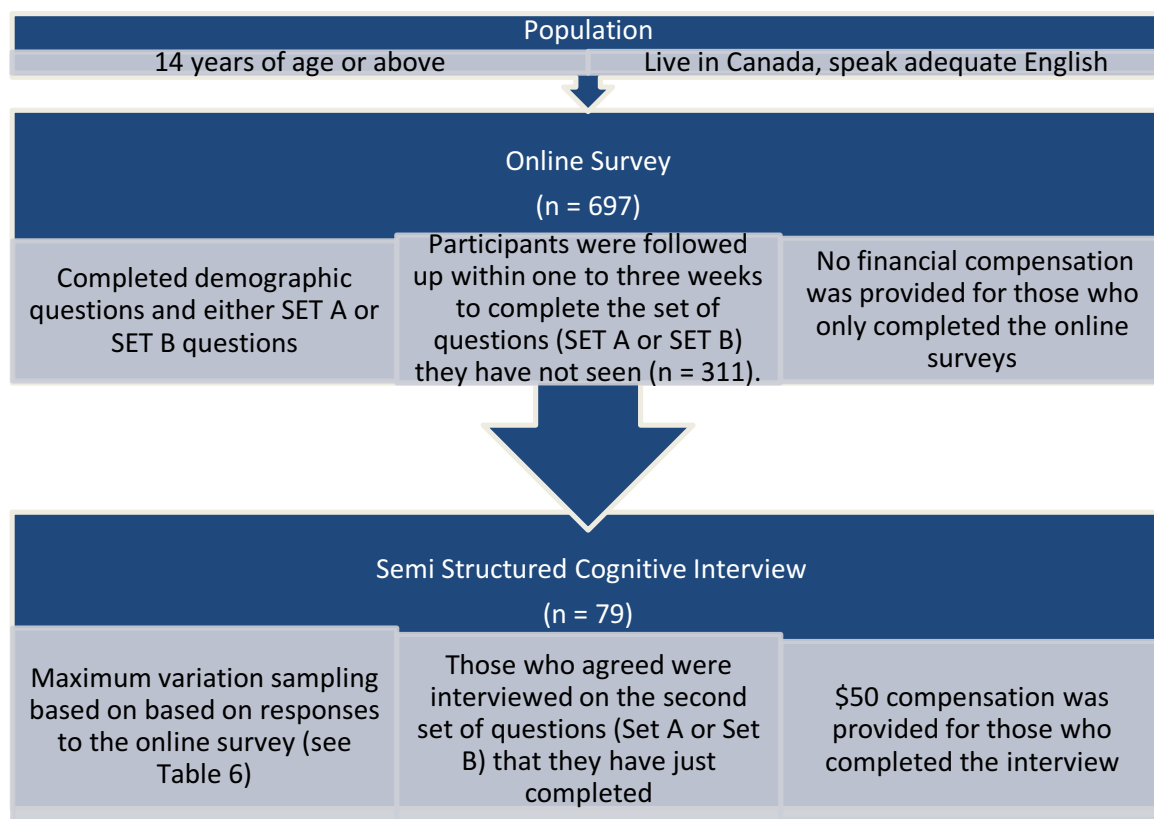
	10 from the Prairies 10 from Alberta 10 from BC 10 from rural areas or small towns 10 from mid-size cities not part of larger urban areas 10 from large cities – urban areas 10 from suburban areas 5 from the north
Immigration and linguistic background	20 who immigrated to Canada 20 from immigrant families 30 whose first language is not English
Aboriginal group and race/ethnicity	10 Aboriginal Maximum diversity across race/ethnicity categories, ensuring that there are more than one participants from each of the categories.
Socioeconomic status (education)	20 over age 25 with high school diploma or less and with parent(s) also having high school diploma or less Maximum diversity with regard to education and parent education
Religiosity	30 who indicate they are religious

After they completed the survey questions in the beginning of their appointment, participants were asked a set of interview questions, as described further in Section 3.3. A semi-structured cognitive interview was used, which is a method used to understand how participants respond to a survey question¹³³. The method is based on the theory that suggests that there exists four stages to participants answering a survey question, which are: question comprehension, remembering relevant information, formulation of a response, and actually responding¹³³. Cognitive interview elucidates at which stage, if any, participants are facing problems with the evaluated survey¹³³.

In current study, participants were only asked to evaluate the second set of survey questions so that they were able to recall step by step how they arrived at the answers they provided. The interviews were done either through Skype or a toll-free number; they were all audio taped without video recording. Out of the 79 total interviews completed, 55 interviews were done through telephone and 24 interviews were done through Skype; 52 interviews were done by JB, while 27 interviews were done by myself. Interview times ranged from 24 minutes to 81 minutes. Participants were compensated with a \$50

gift card of their choice from a list of online stores. Figure 2 illustrates how participants were selected for the online survey and the interview portion of the study.

Figure 2 : Diagram of Two Phase Sampling Mechanism Used in the Study



3.2 Measures from Online Survey

The questionnaire used for this study was drafted by GB and WM, which was then modified by GB, AS and myself. This section lists all the variables that were used in the analysis of this thesis and the questionnaires used to obtain these variables. Appendix E shows the codebook of participants' responses to the online survey.

3.2.1 Demographic Measures

Gender

The measure of gender was kept at three categories, taken from the question “Are you”, “male”, “female”, or “something else”, which was written as a part of sex / gender questions developed by GB for the OHS^{124,130}

Trans Status

Trans status was ascertained from the second OHS sex / gender question, which asked “Do you consider yourself to be trans (transgender, transsexual, or a person with a history of transitioning sex)?”, with the options of “Yes”, “No” and “don’t know”^{124,130}. For those who responded “yes” or “don’t know”, there were four other sets of questions that asked their assigned sex at birth, their felt gender, the gender they currently live in their day to day life and if any, the sex change treatments that they have undertaken. This information was used to determine the trans status of those who responded as “don’t know” (n = 11). They were all classified as non-trans since their day to day life and felt gender were not the opposite of what they were assigned to at birth. Hence, this variable has two categories, which are “cisgender” and “trans”, where cisgender here is defined as anybody who does not identify (or “don’t know”) as trans, and may include genderqueer and non-binary individuals who do not identify as trans.

Gender Identity

A measure of gender identity was created as three categories, which were “cisgender”, “transgender” and “non-binary”. This was obtained from the Two Step Sex / Gender question, which was recommended by the Williams Institute and has been validated in the general population in the US but no studies have evaluated them in Canada^{131,134}. The question asked: “What is your current gender identity?” and “What sex were you assigned at birth, meaning on your original birth certificate?”. There were six options for the first one, which were “Male”, “Female”, “Trans male/Trans man”, “Trans female/Trans woman”, “Genderqueer/Gender non-conforming” and “Different identity (please specify)”; and two options for the second, which were “Male” or “Female”.

They were assigned as transgender if they picked a gender identity that was different to their response that they chose for the gender they were assigned at birth. This was also

done if they have selected “Trans male” or “Trans female”. Those whose gender identity matched their assigned sex at birth were coded as “cisgender”. For those who answered “genderqueer”, they were assigned a “non-binary” identity, separate from trans. Finally, for those who chose a different gender identity, their written responses were examined. For example, those who wrote in “women” with a female sex assigned at birth were recoded as “cisgender”. Others who wrote in “agender” were classified as “non-binary”.

Sex Assigned at Birth

Sex assigned at birth was obtained directly from the second question of the Two Step question, as described above.

Age

Age was kept as 7 intervals, which were: “14 – 18”, “19 – 24”, “25 – 34”, “35 – 44”, “45 – 54”, “55 – 64”, and “65+”.

Youth Status

Participants ages 14 to 24 were considered as youth, while those who were 25 years old or older were considered adults, as defined by the United Nations¹³⁵.

Race / Ethnicity

Race and ethnicity were measured through an indicator variable to determine whether participants were “Non-Aboriginal White”, “Non-Aboriginal racialized”, or “Aboriginal”, as done in other studies¹³⁶. The measures were recoded from two questions of race / ethnicity. The first question was taken directly from CCHS, which asked “You may belong to one or more racial or cultural groups on the following list. Are you ... ? *(Check up to 6 responses)*”: with 13 options, which were: “White”, “South Asian”, “Chinese”, “Black”, “Filipino”, “Latin American”, “Arab”, “Southeast Asian”, “West Asian”, “Korean”, “Japanese”, “Another group, please specify..” or “don’t know”. Participants can select up to 6 out of these available options⁵. Recoding of open ended responses on the race & ethnicity question was done by AS, where responses of European descent such as “Italian”, “Portuguese” were all recoded as white.

The second question asked if respondents identify as First Nations, which asked: “Are you..” with the options of “First Nations”, “Metis”, “Inuk (Inuit)”, “None of the above” or “don’t know”⁵. Participants were automatically assigned as “Aboriginal” if they responded as either First Nations, Metis or Inuit. They were coded as “Non-Aboriginal white” if they identified as white but not First Nations, Metis or Inuit. Those who selected any non-white ethnicities (including those who selected both white and a non-white categories) were classified as “Non-Aboriginal racialized”.

Family Immigration History

A measure of family immigration history was created to determine if one is a “first generation Canadian”, “multi generation Canadian” or “immigrant”. This was taken from two questions developed by our team. One question asked about an individual’s immigration status, which was: “What is your personal history with regard to immigration to Canada?” with the options “Born Canadian”, “Immigrated to Canada from ____” and “In Canada temporarily from ____”. The second question was regarding their family immigration history, which asked: “What is your family history with regard to immigration to Canada? (Check as many as apply)”, with the options “Parent(s) born Canadian” “Parent(s) immigrated to Canada from ____ and ____”, “Parent(s) remained in home country”, “I was adopted by Canadian parents”, and “Don’t know”. One was classified as a first generation Canadian if *both* parents were immigrants; while multi-generational Canadian was classified as those whose *at least one* parent was born Canadian. Finally, the third category was for those who were immigrants themselves or in Canada temporarily. There were no participants who only indicated they were adopted by Canadian parents.

First Language

The measure of first language had three categories, which were “English”, “French” and “Other”.

Education

Education was taken from a question that was adapted from the CCHS question. The question asked “What is the highest level of education that you have attained” with 15 available options and recoded into 4 categories, which were less than secondary school graduation”, “Secondary school graduation, no post-secondary education”, “Some post-secondary education”, and “Post-secondary degree/diploma”, similar to the CCHS¹³⁷. The 15 categories can be found in Appendix E. Those who chose “Other” were recoded accordingly, such as “GED grade 12” was recoded as “secondary school graduation”.

Religiosity

The measure of religiosity was developed by our own team, which asked “Are you a religious person” with a three level ordinal response of “Yes” “Somewhat” and “No”.

Religion

The measure of religious affiliation was also developed by our own team. It asked, “Are you..” with 10 different options, including non-religious affiliation such as “atheist” and “agnostic”. Given the frequencies obtained in our study, this was later recoded as: “Christian”, “Muslim”, “Jewish”, “Sikh, Hindu, Buddhist, Neo-pagan”, “Atheist / Agnostic”, “Other” and skipped. Wherever possible, those who chose “other” were recoded. Responses such as “Anglican” was recoded as “Christian”, while responses such as “human” or “secular humanist” were kept as “other”.

3.2.2 Measures Related to Sexual Orientation

Statistics Canada Response

Since we were interested in data missingness, there were 5 categories that were retained to participants’ responses to the Statistics Canada question, which were: “heterosexual”, “homosexual”, “bisexual”, “don’t know” or skipped.

Sexual Identity SMART Guide

The response to the SMART Guide sexual identity question was also kept as 5 categories, which were “straight”, “gay / lesbian”, “bisexual”, “don’t know” or skipped.

Life Time Sexual Behaviours

We recoded lifetime sexual behaviours “behaviour with opposite sex”, “behaviour with the same sex”, “behaviour with both sexes”, “no sex”, “unclassifiable” and skipped. To ascertain behaviours, the OHS gender question was used to determine “same sex” or “opposite sex”. There were concerns regarding how to ascertain the “opposite sex” and “same sex” for trans and non-binary people. However, in current practice, such participants are invisible in most questions that provide a binary option of “Male” or “Female”. Since we wished to evaluate how the questions work in the current setting, we ignored participants’ trans status to ascertain sexual behaviours. For those who chose a gender that is “something else”, they were considered “unclassifiable”, since they were unclassifiable by the sexual behaviour question that is written under a cisnormativity, the assumption that everybody is cisgender¹²³. There were very few heterosexual MSM or Non-Gay Identified Men who Have sex with Men (NGI MSM) (n = 4). Hence, we did not analyze this group separately.

12 Month Sexual Behaviours

Similarly, 12 month sexual behaviours were coded as “behaviour with opposite sex”, “behaviour with the same sex”, “behaviour with both sexes”, “no sex”, “unclassifiable” and skipped.

Sexual Attraction

We created a total of six sexual attraction categories, which were: heterosexual attraction (includes an only and mostly heterosexual attraction), homosexual attraction (includes an only and mostly homosexual attraction), bisexual attraction (includes attraction that is equally to both sexes), not sure attraction, unclassifiable (includes “other” gender) and skipped. Although other studies have grouped participants’ attractions as “exclusively heterosexual”, “mostly heterosexual”, “bisexual”, and “same sex attraction”^{138,139}, we designed our attraction measure so that it is comparable to the Statistics Canada question that did not include a “mostly” category. We grouped the “mostly” attractions to their closest respective categories since previous studies have claimed that those who identify

as “mostly heterosexuals” and “mostly homosexuals” were more similar to their respective closest categories (heterosexual or homosexual respectively) but less so than bisexual⁴². Similar to the sexual behaviour questions, the gender measure from OHS was used to determine opposite sex and same sex. Those who did not identify with either gender were again made unclassifiable. The not sure attraction was kept as a separate category, which has been shown in previous studies to be its own category⁵⁴.

3.2.3 Coding of Sexual Minorities

In order to evaluate the performance of different measures of sexual orientation in distinguishing sexual minorities from heterosexuals, we created 6 different ways of classifying sexual minorities based on different available measures. They were classified as either “sexual minority”, “heterosexual”, or “undetermined”.

Based on Statistics Canada Question

Based on the Statistics Canada measure, respondents were classified as a sexual minority if they responded as anything other than heterosexual (i.e. as homosexual or bisexual). For those who answered “don’t know” or skipped the question, they were classified as the “undetermined” group, those whose minority status cannot be ascertained.

Based on Sexual Identity from SMART Guide

Similar to how we classified participants from the Statistics Canada question, respondents were classified as a sexual minority by the SMART Guide sexual identity question if they responded as anything other than straight (i.e. as gay / lesbian or bisexual); while “don’t know” and skipped were classified as “undetermined”.

Based on Lifetime Sexual Behaviour from SMART Guide

In classifying minorities based on their life time behaviour, using the recoding described in Section 3.3.2, those who have had behaviours with “same sex” or “both sexes” were considered a sexual minority¹⁴⁰, while those who have only been with “the opposite sex” were considered as heterosexual. Those who were “unclassifiable”, skipped, or “no sex” were considered to be “undetermined”, as has been done in past studies⁵⁹.

Based on Past 12 Month Sexual Behaviour from SMART Guide

This was done in the same way as with lifetime sexual behaviour.

Based on Sexual Attraction

Heterosexual attraction was considered as “heterosexuals”, while bisexual and homosexual attractions were considered as “sexual minority”. Those who skipped, unclassifiable or not sure were considered the “undetermined” category. This was decided collaboratively with GB, JB, AS and RG.

Based on all Four Measures from SMART Guide

Finally, we created an overall measure of sexual minority classification based on the overall four measures from SMART Guide. We did this sequentially where we started with sexual identity, then sexual behaviour, and finally sexual attraction. Respondents needed to be classified as heterosexual on all 4 measures in order to be classified as a non-minority, while if at any step they were a minority, they were classified automatically as a sexual minority. If after examining all four measures we were still unable to classify their minority status, they were classified as undetermined. A figure that summarizes the different possibilities of sexual minority classification based on all 4 measures from SMART Guide can be found in Appendix F.

3.3 Measures and Questions from Cognitive Interview

Interview Transcripts & Analytical Field Notes

Qualitative data were available through the verbatim interview transcripts and analytic field notes. The notes were written by each respective interviewer after the completion of each interview and included a summary of what was discussed in each interview, any important finding or anything notable that occurred during the interview.

Interview Guide

An interview guide was created to aid interviewers in systematically asking participants about the questionnaires and how they conceptualize the three concepts of sex / gender, sexual orientation and race /ethnicity. There were a total of 7 questions for sexual orientation, which were first developed by WM and GB specifically for this study with modifications and addition of more probes from JB and CD. Participants were asked about the set of sexual orientation questions they have just completed, specifically: “How did you decide to answer these questions?”. Probe questions such as: “Was it easy for you? Did you think to answer in any other way?” were followed. Participants were then asked about how they conceptualized their sexual orientation with a more general question such as “How did you understand your own sexual orientation?”. At the end of the sexual orientation section, we also asked questions tying back to surveys, which were “If surveys could ask questions in ways that would make most sense to you, how should they ask about sexual orientation” and “Is it important to include this information on health surveys about sexual orientation?” The full interview guide can be found in Appendix G.

QAS-99

At the end of each interview, interviewer classified the type of problems (if any) that were expressed by participants regarding the questions they have just completed using The Question Appraisal System (QAS-99). This is a system that was designed to evaluate and identify problems associated with survey questions¹⁴¹, which has been used in other studies^{142,143}. A total of 5 categories from the QAS-99 were deemed to be relevant for this thesis, which can be found in Table 7 below:

Table 7: List of QAS-99 Questions for the Two Surveys¹⁴¹

1. CLARITY: Were there any problems related to communicating the intent or meaning of the question?	
<i>1.A WORDING: The question is lengthy, awkward, ungrammatical, or contains complicated syntax?</i>	Yes No
	Comments:
<i>1.B TECHNICAL: The question contains technical term(s) that are undefined, unclear, or complex?</i>	Yes No
	Comments:
<i>1.C VAGUE: There are multiple ways to interpret the question or to decide what is to be included or excluded</i>	Yes No

		Comments:
1.D REFERENCE PERIOD: The time period being referenced is missing, not well-specified or in conflict	Yes No	
2. ASSUMPTIONS: Were there any problems with assumptions made or the underlying logic?		
2.A INAPPROPRIATE: The question makes inappropriate assumptions about you or about your situation	Yes No	
		Comments:
2.B CONSTANCY: The question assumes constant behaviour or experience for situations that vary	Yes No	
		Comments:
2.C DOUBLE-BARRELED: The question wording contains more than one implicit question	Yes No	
		Comments:
3. KNOWLEDGE/MEMORY: Would the respondent be likely not to know or have trouble remembering the information being asked about?		
3.A KNOWLEDGE: You are unlikely to know the answer to the question	Yes No	
		Comments:
3.B RECALL: You may not remember the information asked for	Yes No	
		Comments:
		Comments:
4. RESPONSE CATEGORIES: Is the range of responses offered adequate?		
4.A MISMATCH: The responses offered match the question	Yes No	
		Comments:
4.B TECHNICAL: The responses include technical terms that are undefined, unclear or complex	Yes No	
		Comments:
4.C VAGUE: Some of the responses offered have multiple interpretations	Yes No	
		Comments:
4.D OVERLAPPING: Some of the responses offered are overlapping	Yes No	
		Comments:
4.E MISSING: There are some possible responses missing from the list of responses offered	Yes No	
		Comments:
4.F ORDER: The ordering of responses is illogical	Yes No	
		Comments:
5 OTHER PROBLEMS: Are there any other problems not already mentioned above?		
5. Are there any other problems with the question or responses offered?	Yes No	
		Comments:

Coding of Participants Commentary of the Questions

After all interviews were completed, commentaries by participants about the questions were classified into three binary “yes” or “no” variables, which were: “easy and straight forward”, “necessary changes” and finally “acceptable response”. These variables coded

if participants found the questions to be easy, straight forward and not problematic for themselves, if they felt any changes to the question were necessary, and if they found the response they chose to be acceptable to them. This was determined from the analytic notes and part of the transcript that asked participants “How did you decide to answer this question” was consulted when further information was required. A more detailed description of how this was coded is shown in Table 8 below:

Table 8: Coding of Participants Commentary

Categories	Description
Easy, straight forward, no problem	<p>Yes – Participant found questions to be easy, straightforward, no noticeable problem for themselves <i>at the time they were doing it</i>. They may suggest some changes to the question but in answering the question, they have no major problem to be articulated. If participants implied that the question could be difficult for them at another time in their life but it was straight forward at the time they were doing it, this was not classified as a problem for the participant (but could mean participant require the question to be changed)</p> <p>No – Participant found that they were having problems when answering the question for themselves. This may not necessarily mean they want the question to be changed, but it took them some time to decide. Problems could include, but not limited to: they were not sure what the question was asking, it made certain assumptions, unclear wording, or none of the options fit.</p>
Necessary changes	<p>Yes – Participants said that changes were necessary to the questions. They do not have to say explicitly that they want the question changed, but it is enough for them to say things such as: “Maybe other options should be added”. This includes changes to any part of the questions, including the behaviour and attraction questions.</p> <p>No – Participants never pointed out any problems or necessary changes to the questions.</p>
Acceptable Responses	<p>Yes – Participants found the option that they chose in the survey to be acceptable. Although they may have preferred another term other than those listed in the survey, if participants stated that they feel that the term they chose was also acceptable, this is coded as an “acceptable response”</p> <p>No – Participants dislike the response that they have chosen and it does not represent what their actual identity</p>

3.4 Data Analysis of Online Survey

All quantitative data analysis described in this section was conducted using SAS 9.3.

3.4.1 Inclusion / Exclusion Criteria for Each of the Objectives

Since not all participants completed both questions and the interview, different groups of participants were included and excluded within each objective. A diagram that summarized the inclusion exclusion criteria for each analysis can be found in Appendix H; rationale for inclusion and exclusion can be found in each corresponding section of the relevant objective (Section 3.3.2 to Section 3.3.7).

3.4.2 Descriptive Statistics and Analysis of Loss to Follow Up

Demographics were presented for those who completed all sets of questions ($n = 311$) and those who completed the interviews ($n = 79$). Frequencies and percentages were presented for all response categories, while mean was also presented for age.

The demographics of those who were lost to follow up and those who completed follow up questions were compared to determine if there were notable differences between them. A similar comparison was done between those who declined interview requests with those who completed an interview. This was done separately for those who started with Set A questions from those who started with Set B questions. We define loss to follow up broadly as anybody who did not complete the follow up questions and those who did not provide contact information, including those for whom an interview was requested but never followed back. Those who replied to our email and requested for a follow up rather than an interview were not considered as lost to follow up. Declining the interview was defined as either one of the following: those who did not respond to our interview invitations, those who emailed back to just complete the follow up questions without interviews, or those who scheduled an interview but never showed up nor rescheduled. Fisher's exact test was used to deal with small expected frequencies in the analysis.

3.4.3 Sensitivity and Specificity of the Statistics Canada Measure

Given the classification system we have described in Section 3.2.3 for coding sexual minority status, we examined whether or not the Statistics Canada single question is sensitive and specific enough to capture the overall heterogeneity of minority groups captured by the SMART Guide. Sensitivity and specificity were calculated to determine if those who responded as “homosexual” or “bisexual” to the single item Statistics Canada question encompassed all sexual minorities given the broadest definition¹⁴⁴. We also examined if the single item question captures sexual minorities by different definitions, including 12 months, life time behaviour and by attraction. Those who were undetermined in their minority status and did not complete both questions were excluded from the analysis. Sensitivity analysis was conducted to see if results change when the definition of sexual minority attraction was changed to include those with “*mostly opposite sex*” attractions. This was because while no studies have classified sexual minorities based on attraction, literature had classified “*mostly heterosexual*” groups as a sexual minority⁴². Analyses were also stratified by trans status, given that sexual minority status could be interpreted differently for trans people.

3.4.4 Concordance Analysis Between the Statistics Canada Question with SMART Guide Questions

To measure concordance between different measures of sexual orientation, a Kappa statistic, i.e. chance corrected agreement between two raters was used^{145,146}. All analyses were stratified by trans status and included all participants who completed the follow up (n = 311). Table 9 to 12 illustrates how each dimension was assessed for concordance.

Sexual Minority Status from Statistics Canada vs Overall Status from SMART Guide

First, Kappa Statistic was used to determine if participants were classified similarly as a sexual minority, non-minority or undetermined by both measures.

Table 9: Concordance of Sexual Minority Status between Statistics Canada and SMART Guide

	Statistics Canada		
SMART Guide	Sexual Minority	Heterosexual	Undetermined
Sexual Minority	Concordant	Discordant	Discordant
Heterosexual	Discordant	Concordant	Discordant
Undetermined	Discordant	Discordant	Concordant

Statistics Canada vs Sexual Identity SMART Guide

If the Statistics Canada question were to be interpreted as participant's sexual identities, at minimum we expected that it should have a relatively high agreement with the sexual identity question from SMART Guide, with methods shown in Table 10.

Table 10: Concordance of Responses between Statistics Canada Question and SMART Guide Sexual Identity Question

	Statistics Canada				
Sexual Identity	Heterosexual	Homosexual	Bisexual	Don't know	Skip
Straight	Concordant	Discordant	Discordant	Discordant	Discordant
Gay / lesbian	Discordant	Concordant	Discordant	Discordant	Discordant
Bisexual	Discordant	Discordant	Concordant	Discordant	Discordant
Don't know	Discordant	Discordant	Discordant	Concordant	Discordant
Skip	Discordant	Discordant	Discordant	Discordant	Concordant

Statistics Canada vs Sexual Behaviours (12 months / Life Time)

To understand if the Statistics Canada behavioural description of identities matches participants' actual sexual behaviour, Kappa statistic was calculated. Those who have not had sex, identify with another gender, or responded as "don't know" to the Statistics Canada question were considered "unclassifiable".

Table 11: Concordance of Responses between Statistics Canada Question and SMART Guide Sexual Behaviour Question

	Statistics Canada				
12 months / Life time Behaviours ¹	Heterosexual	Homosexual	Bisexual	Skipped	Unclassifiable ³

1. unclassifiable from SMART Guide includes those who do not identify as male or female

3.4.5 Association of Demographic Characteristics with Sexual Orientation (Statistics Canada) and Overall Sexual Minority Classification

We explored associations between participants' demographic characteristics with their response to the various categories available in the Statistics Canada question. This was done to everyone who completed the Statistics Canada question, excluding “*don't know*” and skipped responses ($n = 488$). As has been discussed in Section 2, literature had identified various demographic groups who were less likely to identify as a sexual minority, which may lead to systematic underreporting. We also explored associations between participants' demographics with sexual minority status given the broadest definition determined by the SMART Guide, as discussed in Section 3.2.3. While no literature has explored if demographics groups were associated with sexual minority status, we hypothesized that the same demographics who were less likely to identify as a sexual minority will also be less likely to be classified as a sexual minority. This was because sexual behaviours with the same sex are prohibited in certain cultures and religion, as much as identification with a sexual minority identity. Only those who completed the follow up were used for this analysis ($n = 311$). Fisher's exact test was used for all analysis since some expected cell counts were less than 5. Table 13 showed the different variables explored in this analysis:

Table 13: Hypothesized Associations between Demographic Characteristics with Sexual Orientation (Statistics Canada) and Sexual Minority Status

Variables that are Potentially Related	Variables that are Potentially Unrelated	Insufficient Literature or Unavailable
<ul style="list-style-type: none"> • Trans Status • Gender • Youth Status • Age • Education • Ethnicity • Religiosity • Religion 	<ul style="list-style-type: none"> • First language 	<ul style="list-style-type: none"> • Family Immigration History • Area of residence (unavailable)

3.4.6 Identifying Demographic Characteristics of Those who Were Unclassifiable

A bivariate analysis with Fisher's exact test was used to explore the association between different demographic groups with the likelihood of having an unclassifiable response to the Statistics Canada question, as determined by a "*don't know*" or skip response. There were very few missing responses to the sexual orientation questions ($n = 1$ for the Statistics Canada question). Hence we decided to only report on the prevalence of missingness but were unable to examine demographic variables associated with missingness. To increase power, we included everyone who completed the Statistics Canada question, regardless of follow up completion ($n = 512$). Table 14 lists the variables explored in this analysis:

Table 14: Hypothesized Associations between Demographic Characteristics and Unclassifiable Responses to Statistics Canada Sexual Orientation Question

Variables that are Potentially Related	Variables that are Potentially Unrelated	Insufficient Literature or Unavailable
<ul style="list-style-type: none"> • Trans Status • Gender • Youth Status • Age • Education • First language 	<ul style="list-style-type: none"> • Religiosity • Religion 	<ul style="list-style-type: none"> • Family Immigration History • Ethnicity • Area of Residence (unavailable)

Using data from those who completed both questions ($n = 311$), we used the McNemar test for paired data to assess whether there was a higher proportion of those unclassifiable by either measure. We compared the proportion who responded as "*don't know*" (or skipped) to the Statistics Canada question with those who responded as "*don't know*" (or skipped) to the sexual identity question from SMART Guide. We also compared the proportion of those who were unclassifiable from both sets. Finally, we compared the proportion of those with a "*not sure*" attraction to those who responded as "*don't know*" (or skipped) to the SMART Guide identity question.

3.5 Analysis of Interview Data

3.5.1 Quantitative Analysis

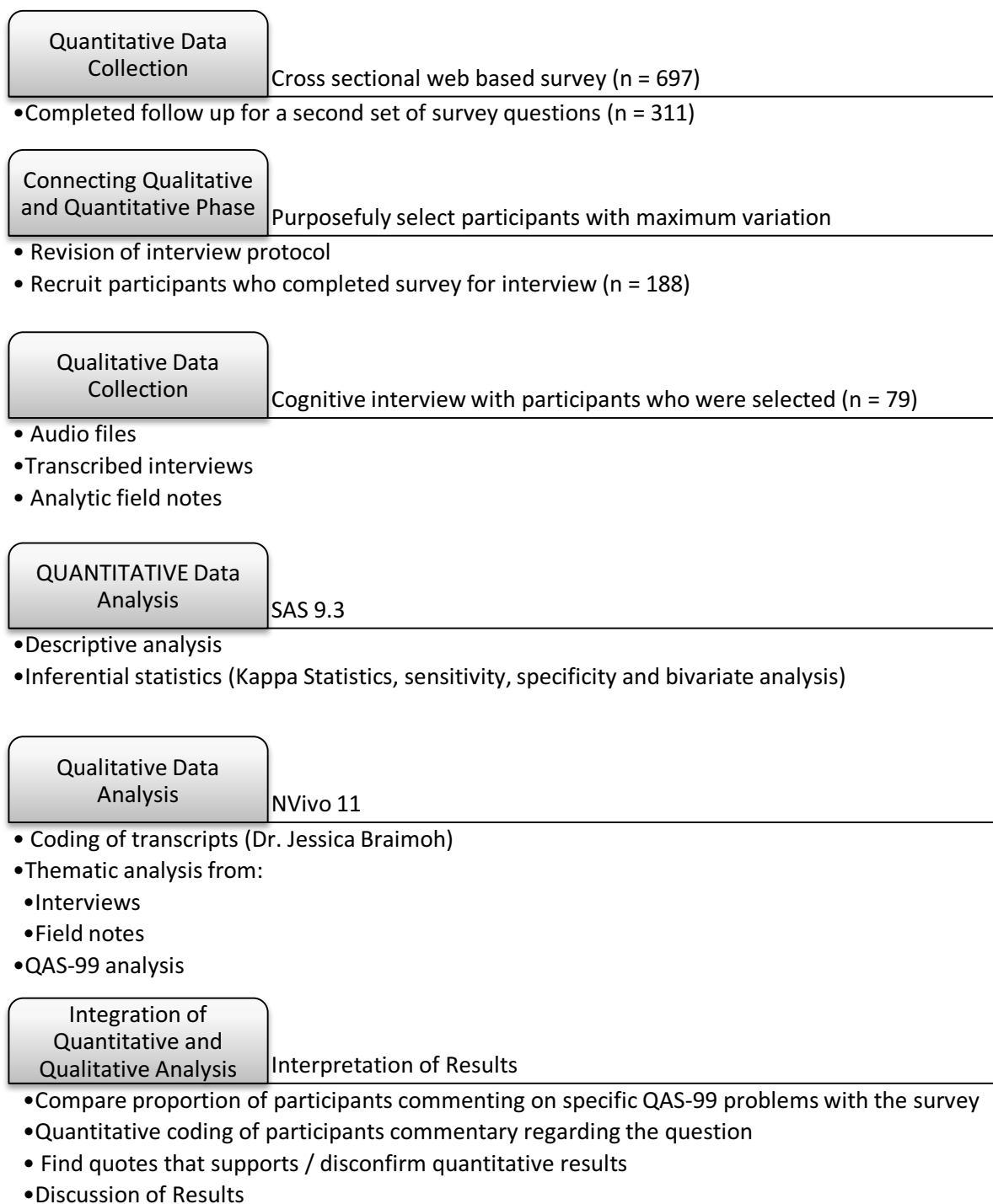
Using the codes of participants' commentaries described in Section 3.3, the proportion of participants who found each question to be easy and if it needs changes were reported; stratified by trans status. Within each category, we also reported proportions of participants who found the response chosen acceptable. Binomial test of proportions that compared the Statistics Canada question with the SMART Guide questions was conducted ($n = 43$, $n = 36$ respectively) to determine if there were differences in the number of participants who believed the question should be changed, the questions were easy for them, and for each of the five relevant categories in QAS-99. No adjustment for multiple testing was done for this analysis. Given a small sample size and the exploratory nature of the analysis, avoiding the potential of inflating Type I error was not considered as a big problem.

3.5.2 Mixed Methods Analysis

While data collection was done concurrently, the analysis of this mixed methods study used a sequential explanatory design, where qualitative analysis was conducted after the quantitative analysis had been completed¹⁴⁷. At the analysis stage, priority was given to the quantitative data and integration of qualitative and quantitative findings occurred at the end of data analysis stage, which made this a QUAN → Qual design¹⁴⁷. Informed by the quantitative results, qualitative data were used to understand reasons for why discordance between the two questions occurred and why certain groups were more likely to choose the responses they chose. In addition, this also enabled us to understand if the categories they had chosen were representative of their experience and to identify misclassifications which were not available from the quantitative data alone. To integrate both quantitative and qualitative data, we looked for commentaries that support or disconfirm both of our significant and non-significant findings from the quantitative data¹⁴⁸. Based on the transcripts that were coded by JB in NVivo 11, I exported the codes that were relevant to the thesis, which were listed in Appendix I. All analytic field notes were also observed to determine if any interview findings supplement or contradicts our

quantitative results. Figure 3 below illustrated how the mixed method process was done in this thesis.

Figure 3: Mixed Methods Analysis Employed in this Thesis



4 RESULTS

4.1 Preliminary Analysis

4.1.1 Descriptive Statistics

A total of 697 people completed the initial survey, 588 of them provided their email and consent to be followed up. Out of those who provided their contact, 311 (53%) participants completed the follow up questions. Regardless of whether or not they completed the follow up, a total 512 participants completed the Statistics Canada sexual orientation question and 496 participants completed the SMART Guide set of questions. Among those who completed the follow up, participants were primarily multi-generational Canadian (68.2%), white (82.3%), identified as female (69.1%), residing in Ontario (55.6%), and graduated from a post-secondary education (77.5%). The majority of participants are also very connected to the community; among those who completed the follow up, a majority of them know someone who is trans (75.0%) and someone who is LGB (98.7%). Given the sampling strategy that tried to recruit a lot of sexual and gender minorities for the interview portion, sexual and gender minorities comprise about 45.3% and 11.3% of the sample. There were very few participants who skipped the sexual orientation questions, only 1 participant refused to answer the single item Statistics Canada question, while 4 people refused to answer at least one of the four sexual orientation questions from SMART Guide. There was a higher rate of “*don’t know*” responses however, with 5.8% of people responding as “*don’t know*” to the single item Statistics Canada question.

As described in Section 3, a total of 79 participants from a maximum demographic variation sample were chosen for the interview. While the majority of the groups that were targeted were reached, there were no interviews with participants from the Northwest Territories or PEI; also no interviewed participants identified as West Asian. We also had very few participants who did not know anybody who was LGB, who were religious cisgender male, and who were 65 years of age or older. The demographic breakdown of both interview participants and those who completed the follow up questions were shown in Table 15. The demographics of all participants who completed

the Statistics Canada (n = 512) or the SMART Guide questions (n = 496) regardless of follow up completion were very similar and can be found in Appendix J.

Table 15: Sociodemographic Characteristics of Participants in the Study

	Number (%) – Completed Follow Up (n = 311)	Number (%) – Completed Interview (n = 79)
Gender		
Male	61 (19.6)	23 (29.1)
Female	215 (69.1)	43 (54.4)
Something Else	35 (11.3)	13 (16.5)
Gender Identity		
Cisgender	240 (77.2)	49 (62.0)
Trans	35 (11.3)	12 (15.2)
Non-binary	36 (11.6)	18 (22.8)
Trans Status		
Yes	53 (17.0)	21 (26.6)
No	258 (83.0)	58 (73.4)
Sex Assigned at Birth		
Male	72 (23.2)	28 (35.4)
Female	237 (76.2)	51 (64.6)
Skipped	2	0
Residence		
Alberta	20 (6.4)	8 (10.1)
British Columbia (BC)	57 (18.3)	21 (26.6)
Manitoba	7 (2.3)	4 (5.1)
New Brunswick	16 (5.1)	6 (7.6)
Newfoundland and Labrador	2 (0.6)	1 (1.3)
Nova Scotia	14 (4.5)	4 (5.1)
Ontario	173 (55.6)	25 (31.7)
Prince Edward Islands (PEI)	0	0
Quebec	11 (3.5)	7 (8.9)
Saskatchewan	11 (3.5)	3 (3.8)
Northwest Territories, Nunavut, and Yukon	0	0
Refused	0	0
Education		
Post-secondary graduation	241 (77.5)	53 (67.1)

Some post-secondary	47 (15.1)	15 (19.0)
Secondary graduation (no post-secondary)	14 (4.5)	7 (8.9)
Less than secondary graduation	9 (2.9)	4 (5.1)
Race / Ethnicity¹		
White	256 (82.3)	52 (65.8)
South Asian	11 (3.5)	7 (8.9)
Chinese	19 (6.1)	8 (10.1)
Black	11 (3.5)	8 (10.1)
Filipino	2 (0.6)	2 (2.5)
Latin American	7 (2.3)	4 (5.1)
Arab	3 (1.0)	1 (1.3)
Southeast Asian	7 (2.3)	3 (3.8)
West Asian	2 (0.6)	0
Korean	1 (0.3)	1 (1.3)
Japanese	2 (0.6)	2 (2.5)
Another group	7 (2.3)	5 (6.3)
Don't know	0	0
Multiracial (more than one race)	34 (10.9)	14 (17.7)
Skipped	4	2
Age		
14-18	17 (5.5)	7 (8.9)
19-24	50 (16.1)	15 (19.0)
25-34	113 (36.3)	21 (26.6)
35-44	60 (19.3)	15 (19.0)
45-54	35 (11.3)	7 (8.9)
55-64	33 (10.6)	13 (16.5)
65+	3 (1.0)	1 (1.3)
Skipped	0	0
Mean age	35.3	36.0
Religiosity		
Yes	35 (11.3)	10 (12.7)
Somewhat	75 (24.1)	20 (25.3)
No	200 (64.3)	49 (62.0)
Skipped	1	0
Religion		
Christian	75 (24.1)	18 (22.8)
Muslim	9 (2.9)	6 (7.6)
Jewish	16 (5.1)	4 (5.1)
Sikh, Hindu, Buddhist, Neo-pagan	23 (7.4)	8 (10.1)
Agnostic / Atheist	145 (46.6)	28 (35.4)

Other	35 (11.3)	12 (15.2)
Skipped	8	3
First Nations Status		
First Nations, Metis, Inuit	11 (3.6)	8 (10.3)
Non Aboriginal	294 (94.8)	68 (87.2)
Don't know	5 (1.6)	2 (2.6)
Skipped	1	1
Family Immigration History		
Multi-Generational Canadian	212 (68.2)	42 (53.2)
First Generation Canadian	47 (15.1)	20 (25.3)
Immigrants	52 (16.7)	17 (21.5)
First language		
English	267 (85.9)	62 (78.5)
French	7 (2.3)	2 (2.5)
Other	37 (11.9)	15 (19.0)
Sexual Orientation (Statistics Canada)		
Heterosexual	151 (48.6)	26 (32.9)
Homosexual	57 (18.3)	20 (25.3)
Bisexual	84 (27.0)	22 (27.9)
Don't Know	18 (5.8)	11 (13.9)
Skipped	1	0
Sexual Identity (SMART Guide)		
Straight	148 (47.6)	26 (33.7)
Gay / Lesbian	58 (18.7)	22 (28.6)
Bisexual	80 (25.7)	19 (24.7)
Don't know	22 (7.1)	10 (13.0)
Skipped	3	2
Sexual behaviour – 12 months		
Opposite sex only	152 (48.9)	29 (36.7)
Same sex only	49 (15.8)	17 (21.5)
Both sexes	14 (4.5)	2 (2.5)
Have not had sex	61 (19.6)	18 (22.8)
Unclassifiable	34 (10.9)	12 (15.2)
Skipped	1	1
Sexual behaviour – Lifetime		

Opposite sex only	130 (41.8)	22 (27.9)
Same sex only	20 (6.4)	5 (6.3)
Both sexes	106 (34.1)	32 (40.5)
Have not had sex	20 (6.4)	7 (8.9)
Unclassifiable	34 (10.9)	12 (15.2)
Skipped	1	1
Sexual Attraction		
Same sex only	18 (5.8)	7 (8.9)
Mostly the same sex	47 (15.11)	17 (21.5)
Equally to both sexes	27 (8.7)	6 (7.6)
Mostly the opposite sex	85 (27.3)	14 (17.7)
Opposite sex only	90 (28.9)	20 (25.3)
Unclassifiable	31 (10.0)	11 (13.9)
Not sure	12 (3.9)	3 (3.8)
Skipped	1	1

1. People can choose more than one race, so will not add up to 100%

4.1.2 Analysis of Loss to Follow Up and Interview Decline

There was no statistically significant difference between those who completed the follow up questions and those who did not among both who first completed SET A and first completed SET B. In terms of interview completion, there was a statistically significant difference in terms of gender, trans status and ethnoracial background. More specifically, those who identified as trans were more likely to agree to an interview than those who were cisgender; those who were sexual minorities were more likely to agree to an interview than those who were heterosexual; both of those who were racialized (non-Aboriginal) and Aboriginals were more likely to agree for an interview than those who were white (all $p < 0.05$). This was found among those who completed the Set A questions first but not among those who completed Set B questions first. No other demographic differences (such as in religiosity, religion, education, age, youth status and family immigration status) were significantly associated with completing the interview. Tables that illustrated this analysis can be found in Appendix K.

4.2 Results from Quantitative Survey Data

4.2.1 Sensitivity and Specificity of the Statistics Canada Measure

Out of the 311 people who completed the follow up, 48 were unclassifiable in their sexual minority status from at least one of the two sets of questions. Hence a total of 263 participants' responses were used for this analysis. No trans participants were classified as a sexual minority based on the SMART Guide questions. The sensitivity and specificity of the Statistics Canada question in capturing sexual minorities given the broadest definition were 85.8% (95% CI: 80.4% to 91.1%, $n = 263$) and 100.0% respectively. This suggested that all heterosexuals from the broadest definition of sexual orientation were always classified correctly as heterosexuals, while about 14% of sexual minorities would be misclassified as heterosexuals by this single question. When we relaxed the definition of sexual minorities to include those with sexual attractions to "*mostly the opposite sex*", sensitivity was reduced to 68.0% (95% CI: 61.6% to 74.3%, $n = 271$), while specificity was kept at 100.0%.

Excluding those unclassifiable by their sexual orientation identities from SMART Guide, the Statistics Canada item had a 99.3% (95% CI: 97.8% to 100%, $n = 281$) sensitivity and 100.0% specificity in capturing a sexual minority identity. This means that the Statistics Canada question correctly distinguishes those who identify as heterosexual from those who identify as a minority.

In capturing sexual minority behaviour during the past year, sensitivity and specificity were 98.4% (95% CI: 95.3% to 100%, $n = 211$) and 80.4% (95% CI: 74% to 86.8%, $n = 211$) respectively. Sample sizes were substantially smaller after excluding those who were unclassifiable by their sexual behaviour. The sensitivity value inferred that there were almost no individuals who responded as heterosexuals to the Statistics Canada question but reported same sex experiences in the past 12 months in the current sample; those who reported same sex experiences in the past 12 months were very likely to be classified as sexual minorities through the single item question. However, contrary to the result from the broadest definition of sexual minorities, the specificity was 80%, which

indicated that about 20% of those who only have had heterosexual behaviours within the past 12 months were classified as a sexual minority by the single item question.

Even poorer performance of the single item question was found in capturing life time sexual behaviours, with sensitivity and specificity of 84.2% (95% CI: 77.6% to 90.7%, $n = 248$) and 93.7% (95% CI: 89.6% to 97.9%, $n = 248$) respectively. The sensitivity implies that 84% of those who ever have had sex with the same sex were correctly classified as a sexual minority but 16% of those were classified as heterosexual.

Specificity illustrates that 94% of those who have only ever been with the opposite sex were correctly identified as heterosexual, while 6% of those who had only been with the opposite sex were identified as a sexual minority. Finally, for the dimension of sexual attraction, there was a sensitivity of 97.8% (95% CI: 94.7% to 100%, $n = 260$). This again means that 98% of those who were attracted to the same sex or both sexes were identified as sexual minorities. There was also a specificity of 86.5% (95% CI: 81.3% to 91.6%, $n = 260$), which means that 87% of those who were attracted to the “*opposite sex*” or “*mostly the opposite sex*” were correctly identified as heterosexuals but 13% of them were identified as sexual minorities.

When results were stratified based on trans status, results among those who were cisgender were very similar to the overall results, both in numbers and conclusion. However, among those who identified as trans, this was different, sensitivity in capturing overall sexual minority status was 92.1% (95% CI: 83.5% to 100%, $n = 38$), which was higher than those who were cisgender. Furthermore, since no trans people were classified as heterosexuals from the broadest definition in our sample, specificity cannot be calculated. Among trans people, there was a 100.0% sensitivity and a 25% (95% CI: 0% to 67.4%, $n = 15$) specificity in capturing past year behaviour, while there was a 100% sensitivity and 40% (95% CI: 0 to 82.9%, $n = 20$) specificity in capturing minority attraction among trans people. Care must be taken however in interpreting these numbers since the sample size was very small and confidence intervals were wide. Results were summarized in Table 16 below:

Table 16: Sensitivity, Specificity of the Statistics Canada Single Item Question

	Cisgender % (95% CI)	Trans % (95% CI)	Overall % (95% CI)
Sexual Minority Status, Broadest Definition*			
	n = 225	n = 38	n = 263
Sensitivity	83.9 (77.4 to 90.3)	92.1 (83.5 to 100)	85.8 (80.4 to 91.1)
Specificity	100	- ⁺	100
Sexual Minority Identity*			
	n = 244	n = 37	n = 281
Sensitivity	98.1 (94.3 to 100)	100	99.3 (97.8 to 100)
Specificity	100	100	100
Sexual Minority Behaviour, Past Year*			
	n = 196	n = 15	n = 211
Sensitivity	98.1 (94.3 to 100)	100	98.4 (95.3 to 100)
Specificity	81.9 (75.6 to 88.2)	25 (0 to 67.4)	80.4 (74.0 to 86.8)
Sexual Minority Behaviour, Lifetime*			
	n = 231	n = 17	n = 248
Sensitivity	82.7 (75.4 to 90.0)	- [±]	84.2 (77.6 to 90.7)
Specificity	94.5 (90.5 to 98.5)	- [±]	93.7 (89.6 to 97.9)
Sexual Minority Attraction*			
	n = 240	n = 20	n = 260
Sensitivity	97.3 (93.7 to 100)	100	97.8 (94.7 to 100)
Specificity	87.8 (82.9 to 92.9)	40 (0 to 82.9)	86.5 (81.3 to 91.6)

* Sample size differs because each analysis excludes those who were unclassifiable based on each dimensions of sexual orientation. See below:

Unclassifiable by Statistics Canada question (n = 19); broadest definition of sexual minorities from SMART Guide (n = 32); both (n = 3).

Unclassifiable by SMART Guide sexual identity (n = 25); Unclassifiable by sexual behaviour in the past year (n = 96); Unclassifiable by sexual behaviour in their life time (n = 55); Unclassifiable by sexual attraction (n = 44).

+ Specificity for these dimensions cannot be calculated because no trans persons were classified as heterosexual by the composite measure

±. These numbers are uninterpretable for trans people since it is unknown when they have sex (see Discussion Section 5.2.2)

4.2.2 Concordance Analysis between the Statistics Canada Question and the SMART Guide Questions

The Kappa statistics between the two sets of questions in measuring the chance-corrected agreement of classifying whether one was a sexual minority, heterosexual or unclassifiable was 0.62 (95% CI: 0.55 to 0.69), which was a moderate level of agreement. However, this value was much lower among trans people, with a Kappa of 0.10 (95% CI: -0.05 to 0.24), indicating an agreement no better than chance. Agreement between the sexual identity question from SMART Guide with the Statistics Canada question was 0.89 (95% CI: 0.85 to 0.93). This suggests a high agreement between the two questions; participants generally interpreted the question to be asking about sexual identity, although this value was lower among trans people than cisgender people, with a Kappa Statistic of

0.76 (95% CI: 0.62 to 0.90) and 0.92 (95% CI: 0.87 to 0.96) respectively. On the other hand, there was a much lower agreement between the Statistics Canada question with both life time and 12 month behaviours, which gave a Kappa Statistic of 0.39 (95% CI: 0.33 to 0.46) and 0.48 (95% CI: 0.41 to 0.55) respectively. This value was much lower among trans people, the agreement was 0.11 (95% CI: -0.02 to 0.24) for past year behaviour and 0 (95% CI: -0.15 to 0.15) for life time behaviour. A Kappa of zero suggested that the agreement was no better than chance alone. Among cisgender people, the value was higher for both, with an agreement of 0.41 (95% CI: 0.33 to 0.48) for past year behaviour and 0.55 (95% CI: 0.47 to 0.63) for life time behaviour. Finally, the agreement between the single item question with sexual attraction was 0.57 (95% CI: 0.50 to 0.63). This value was again much lower among trans people than cis people, with an agreement of 0.27 (95% CI: 0.15 to 0.41) for trans individuals and 0.62 (95% CI: 0.55 to 0.70) for cis people. When we considered “*mostly*” attractions as bisexual attractions, agreement with sexual attraction was reduced to 0.40 (95% CI: 0.33 to 0.47). Table 17 below summarized this result:

Table 17: Chance-Corrected Agreement Between the Statistics Canada Measure and other Measures of Sexual Orientation

	Cisgender (n = 258) kappa (95% CI)	Trans (n = 53) kappa (95% CI)	Overall (n = 311) kappa (95% CI)
Statistics Canada vs. sexual minority, broadly defined	0.65 (0.58 to 0.73)	0.10 (-0.05 to 0.24)	0.62 (0.55 to 0.69)
Statistics Canada vs sexual identity	0.92 (0.87 to 0.96)	0.76 (0.62 to 0.90)	0.89 (0.85 to 0.93)
Statistics Canada vs. sexual behaviour, past year	0.41 (0.33 to 0.48)	0.11 (-0.02 to 0.24)	0.39 (0.33 to 0.46)
Statistics Canada vs. sexual behaviour, life time	0.55 (0.47 to 0.63)	0.00 (-0.15 to 0.15)	0.48 (0.41 to 0.55)
Statistics Canada vs. sexual attraction	0.62 (0.55 to 0.70)	0.27 (0.15 to 0.41)	0.57 (0.50 to 0.63)

4.2.3 Association of Demographic Characteristics with Sexual Orientation (Statistics Canada Measure) and Overall Sexual Minority Classification

Gender, ethnicity, religion, age, youth status and trans status were all significantly related to how participants responded to the Statistics Canada question ($p < 0.05$). More specifically, among those who identified as a sexual minority, there were more females who identified as bisexuals than homosexuals (26.6% to 14.2%) while there were more males who identified as homosexuals than bisexual (30.2% to 14.2%). Those who chose “something else” for their gender were also more likely to choose the category bisexual compared to those who chose a “Male” or “Female” gender. Those who identify as trans were more likely to choose a non-heterosexual option ($p < 0.05$). In terms of ethnicity, Non-Aboriginal racialized were less likely to respond as sexual minorities compared to those who were White and compared to those who were Aboriginal, but there were no differences between those who were White and Aboriginal. Finally, there were more youth who identified as bisexual. This was summarized in Table 18 below:

Table 18: Bivariate Analysis of Sexual Orientation Responses in Statistics Canada Question

		Heterosexual – n (%)	Homosexual – n (%)	Bisexual – n (%)	Overall p- value ¹
Gender					
	Male	52 (49.1)	32 (30.2)	22 (20.8)	< 0.001
	Female	201 (59.3)	48 (14.2)	90 (26.6)	
	Something else	5 (11.9)	15 (35.7)	22 (52.4)	
Trans Status					
	Cisgender	249 (57.5)	77 (17.8)	107 (24.7)	< 0.001
	Trans	9 (16.4)	19 (34.6)	27 (49.1)	
Education					
	post-secondary graduation	208 (55.8)	71 (19.0)	94 (25.2)	0.07
	some post-secondary	33 (43.4)	19 (25)	24 (31.6)	
	secondary graduation (no post-secondary)	14 (53.9)	4 (15.4)	8 (30.8)	
	less than secondary graduation	3 (23.1)	2 (15.4)	8 (61.6)	
Religiosity					

	Yes	30 (65.2)	6 (13.0)	10 (21.7)	0.21
	Somewhat	66 (58.4)	20 (17.7)	27 (23.9)	
	No	161 (49.1)	70 (21.3)	97 (29.6)	
Religion					
	Christian	88 (72.7)	18 (14.9)	15 (12.4)	< 0.01
	Muslim	9 (75.0)	0	3 (25.0)	
	Jewish	7 (30.4)	11 (47.8)	5 (21.7)	
	Sikh, Hindu, Buddhist, Neo-pagan	14 (38.9)	7 (19.4)	15 (41.7)	
	Atheist / Agnostic	110 (48.9)	43 (19.1)	72 (32.0)	
	Others	26 (44.8)	14 (24.1)	18 (31.0)	
	Skipped	4 (30.8)	3 (23.1)	6 (46.2)	
Ethnoracial Background					
	Aboriginal (First Nations, Metis or Inuit)	9 (37.5)	4 (16.7)	11 (45.8)	0.03
	Non-Aboriginal White	189 (51.4)	72 (19.6)	107 (29.1)	
	Non-Aboriginal racialized	58 (63.0)	19 (20.7)	15 (16.3)	
Family Immigration History					
	Multi-Generational Canadian	176 (52.7)	71 (21.3)	87 (26.1)	0.43
	First Generation Canadian	37 (48.1)	14 (18.2)	26 (33.8)	
	Immigrants	45 (58.4)	11 (14.3)	21 (27.3)	
Age					
	14- 18	5 (25)	4 (20)	11 (55)	< 0.01
	19 to 24	49 (57.0)	9 (10.5)	28 (32.6)	
	25 to 34	91 (54.5)	33 (19.8)	43 (25.8)	
	35 to 44	55 (58.5)	17 (18.1)	22 (23.4)	
	45 to 54	28 (41.2)	23 (33.8)	17 (25.0)	
	55 to 64	21 (52.5)	8 (20.0)	11 (27.5)	
	65+	8 (66.7)	2 (16.7)	2 (16.7)	
Youth Status					
	14 - 24	55 (51.4)	13 (12.2)	39 (36.5)	0.02
	25+	203 (53.3)	83 (21.8)	95 (24.9)	
Total		258 (53.0)	96 (19.5)	134 (27.5)	488

1. Fisher's exact test was used since some cells were very sparse

Using the broadest definition of sexual minorities determined by the SMART Guide, trans status, gender, youth status, education, ethnicity, religiosity and religion were all significantly associated with one's minority classification ($p < 0.05$). Youth were more likely to be classified as "*undetermined*" compared to non-youth ($p < 0.01$). There were also significantly higher proportions of Aboriginal individuals compared to whites who were classified as a sexual minority ($p < 0.05$) and significantly lower proportions of racialized (non-Aboriginal) persons who were classified as a sexual minority compared to whites ($p < 0.05$). Finally, there was also a significantly lower proportion of religious individuals who were classified as a sexual minority compared to those who were not religious ($p = 0.21$). No participants who identified as trans were classified as heterosexual by this broadest definition. Those with a lower than secondary education or with only secondary education were also more likely to be classified as a minority ($p < 0.05$). Table 19 summarized this result:

Table 19: Bivariate Analysis of Sexual Minority Classification from SMART Guide

		Heterosexual – n (%)	Sexual Minority – n (%)	Unclassifiable – n (%)	Overall p-value ¹
Gender					
	Male	18 (29.5)	35 (57.4)	8 (13.1)	< 0.001
	Female	83 (38.6)	108 (50.2)	24 (11.1)	
	Something else	0	35 (100)	0	
Trans Status					
	Cisgender	101 (39.2)	127 (49.2)	30 (11.6)	< 0.001
	Trans	0	51 (96.2)	3 (3.8)	
Education					
	post-secondary graduation	88 (36.5)	132 (54.8)	21 (8.7)	0.001
	some post- secondary	13 (27.7)	23 (61.7)	5 (10.6)	
	secondary graduation (no post-secondary)	0	9 (64.3)	5 (35.7)	
	less than secondary graduation	0	8 (88.9)	1 (11.1)	
Religiosity					
	Yes	8 (22.9)	18 (51.4)	9 (25.7)	0.04
	Somewhat	28 (37.3)	40 (53.3)	7 (9.3)	
	No	64 (32)	120 (60)	16 (8)	

Religion					
	Christian	36 (48.0)	39 (38.7)	10 (13.3)	< 0.001
	Muslim	2 (22.2)	3 (33.3)	4 (44.4)	
	Jewish	2 (12.5)	12 (75)	2 (12.5)	
	Sikh, Hindu, Buddhist, Neo-pagan	5 (21.7)	15 (65.2)	3 (13.0)	
	Atheist / Agnostic	51 (35.2)	81 (55.9)	13 (9.0)	
	Others	4 (11.4)	31 (88.6)	0	
	Skipped	1 (12.5)	7 (87.5)	0	
Ethnoracial Background					
	Aboriginal (First Nations, Metis or Inuit)	2 (18.2)	9 (81.8)	0	= 0.03
	Non-Aboriginal White	71 (30.3)	142 (60.7)	21 (9.0)	
	Non-Aboriginal racialized	27 (42.9)	26 (41.3)	10 (15.9)	
Family Immigration History					
	Multi-Generational Canadian	67 (31.6)	127 (59.9)	18 (8.5)	0.39
	First Generation Canadian	15 (31.9)	24 (51.1)	8 (17.0)	
	Immigrants	19 (36.5)	27 (51.9)	6 (11.5)	
Age					
	14 - 18	1 (5.9)	12 (70.6)	4 (23.5)	< 0.01
	19 to 24	18 (36.0)	21 (42.0)	11 (22.0)	
	25 to 34	44 (38.9)	65 (57.5)	4 (3.5)	
	35 to 44	21 (35.0)	33 (55.0)	6 (10)	
	45 to 54	7 (20.0)	24 (68.6)	4 (11.4)	
	55 to 64	8 (24.2)	22 (66.7)	3 (9.1)	
	65+	2 (66.7)	1 (33.3)	0	
Youth Status					
	14 - 24	19 (28.4)	33 (49.3)	15 (22.4)	0.003
	25+	82 (33.6)	145 (59.4)	17 (7.0)	
Total		101 (32.5)	178 (57.2)	32 (10.3)	311

† Fisher's exact test was used since some cells were very sparse

4.2.4 Identifying Demographic Characteristics of Those who Were Unclassifiable

Participants who identified as trans and those who identified as neither male nor female were more likely to choose “*don’t know*” ($p < 0.05$). There were no significant demographic differences between those who answered “*don’t know*” in terms of age, ethnicity, religion, youth status, and education. This is shown in Table 20 below:

Table 20: Bivariate Analysis of Unclassifiable Responses from Statistics Canada

Question		No problem with the question – n (%)	Don't Know – n (%)	Overall p-value ¹
Gender				< 0.001
	Male	106 (95.5)	5 (4.5)	
	Female	339 (97.4)	9 (2.6)	
	Something else	42 (80.8)	10 (19)	
Trans Status				< 0.001
	Cisgender	433 (98.2)	8 (1.8)	
	Trans	55 (77.5)	16 (22.5)	
Education				0.10
	post-secondary graduation	373 (96.1)	15 (3.9)	
	some post-secondary	76 (95)	4 (5.0)	
	secondary graduation (no post-secondary)	26 (89.7)	3 (10.3)	
	less than secondary graduation	13 (86.7)	2 (13.3)	
Ethnoracial Background				0.85
	Aboriginal (First Nations, Metis or Inuit)	24 (96)	1 (4)	
	Non-Aboriginal White	368 (95.1)	20 (5.2)	
	Non-Aboriginal racialized	92 (96.8)	3 (3.1)	
Family Immigration History				0.80
	Multi-Generational Canadian	334 (95.4)	16 (4.6)	
	First Generation Canadian	77 (96.3)	3 (3.8)	
	Immigrants	77 (93.9)	5 (6.1)	
Age				

	Below or equal 18	20 (83.3)	4 (16.7)	0.17
	19 to 24	86 (96.6)	3 (3.4)	
	25 to 34	167 (95.4)	8 (4.6)	
	35 to 44	94 (96.9)	3 (3.1)	
	45 to 54	68 (97.1)	2 (2.9)	
	55 to 64	40 (90.9)	4 (9.1)	
	65+	12 (100)	0	
Youth Status				
	14 - 24	107 (93.9)	7 (6.1)	0.45
	25+	381 (95.7)	17 (4.3)	
First Language				
	English	416 (95.6)	19 (4.4)	0.42
	French	12 (92.3)	1 (7.7)	
	Other	60 (93.8)	4 (6.3)	
Total		488 (95.3)	24 (4.7)	512

† Fisher's exact test was used since some cells were very sparse

Among the 311 participants who completed the follow up, more participants chose “*don't know*” to the SMART Guide identity questions ($n = 25$) compared to the Statistics Canada question ($n = 19$), but there was no significant difference by the McNemar's test ($p = 0.21$). There were also a greater number of participants who were unclassifiable on their sexual minority status based on the broadest definition of sexual minorities from the SMART Guide questions ($n = 32$) compared to those who were unclassifiable based on the Statistics Canada question ($n = 19$), but the difference was only approaching significance by the McNemar's test ($p = 0.07$). Finally, there was a lower number of participants who chose a “*not sure*” attraction ($n = 12$) compared to the number of participants who chose “*don't know*” to the sexual identity question on SMART Guide ($n = 25$), and this difference was statistically significant ($p < 0.01$).

4.3 Results from Interview Data

Qualitative analysis from 79 interviews of individuals with demographic variation described in Section 4.1 revealed that many participants were having problems with the questions. Both quantitative and qualitative analyses were reported in this section.

4.3.1 Quantitative Analysis of Interview Data

Comparing Participants' Commentaries to the Two Questions

More participants who were interviewed on the Statistics Canada question believed that the question requires changes (79.1%) compared to those interviewed on the SMART Guide questions (66.7%). This difference was not statistically significant at the 0.05 level ($p = 0.31$). Among those who believed the questions should be changed, about 52.9% interviewed on the Statistics Canada question found the question to be problematic for them, while about 50% of those interviewed on the SMART Guide believed the questions were problematic for them. This was summarized in Table 21 below:

Table 21: Frequencies of Participants Commentaries to the Two Sexual Orientation Questions

Category	n (%)					
	Statistics Canada Question (n = 43)			SMART Guide Questions (n = 36)		
	Cisgender	Trans	Overall	Cisgender	Trans	Overall
Question was easy for themselves, not a problem						
Yes	20 (64.5)	5 (41.7)	25 (58.1)	19 (70.4)	3 (33.3)	22 (61.1)
No	11 (35.5)	7 (58.3)	18 (41.9)	8 (29.6)	6 (66.7)	14 (38.9)
Question Requires Changes						
Yes	22 (71.0)	12 (100.0)	34 (79.1)	17 (63.0)	7 (77.8)	24 (66.7)
No	9 (29.0)	0	9 (20.9)	10 (37.0)	2 (22.2)	12 (33.3)

Comparing QAS-99 of the two Questions

The most prevalent responses that occur in the QAS-99 system are response categories and “other” problems, which were discussed further in the qualitative results. There were significantly fewer individuals who reported a problem with the response options on the SMART Guide compared to those who reported problems with the response options on the Statistics Canada question ($p = 0.02$). No other problems on the QAS-99 were significantly different between the two sets of questions, as shown in Table 22 below:

Table 22: QAS-99 Comparison of the Two Sexual Orientation Questions

	n (%) – Problem with the Question		
QAS Problem	Statistics Canada	SMART Guide	p-value ¹
Clarity	9 (20.9)	13 (36.1)	0.21
Assumptions	10 (23.3)	13 (36.1)	0.23

Knowledge / Memory	0	1 (2.78)	0.46
Response Categories	32 (74.4)	17 (47.2)	0.02
Other Problems	19 (44.2)	9 (25)	0.10

[†] Fisher's exact test was used since some cells were very sparse

4.3.2 Commentaries on the Statistics Canada Question

Clarity

Participants who did not have problems with the question told us that they answered it with the “truth” and it was straight forward and easy for them. This applied to all participants, whether or not they were straight, gay, bisexual, or whether or not they were cisgender or trans.

(Cis man, 45-54 years old, Aboriginal, Western Canada, heterosexual) “I don’t think there’s any other way of saying it than—than that’s—I’ve always considered myself to be heterosexual, attracted to um, the opposite sex.”

For other participants, this question was not as clear. For many, the problem was around clarity on exactly what the question is exactly asking. Issues of clarity were particularly salient for genderqueer and trans participants due the wordings of “*opposite sex*” and “*same sex*”, as shown by the following genderqueer participant

(Genderqueer, 45-54 years old, White, Maritimes, “don’t know”) “So I wasn’t sure, for instance, when you say ‘homosexual’ and then two people of the same sex, if we’re just talking about body types, that’s one thing, whereas if you’re really trying to encompass gender under the word ‘sex,’ then that’s a completely different question. So I said ‘I don’t know’ because I basically didn’t understand what was meant by the question. [...] how I would classify myself is not on that list, so therefore, I would have to—given that the list is talking about sex with terms like ‘homosexuality,’ ‘heterosexuality,’ I would say that I don’t know what the question is asking.....”

Assumptions

Some participants problematized the behavioural definition that was conflated with the sexual orientation identities presented. However, not all participants who have had a discordant sexual experience (i.e. sexual behaviours that do not match their sexual identity) actually described this question to be problematic. Furthermore, while some participants were aware of how behavioural discordance could cause a problem, a few did suggest that these definitions were useful to help understand the question.

(Trans man, 25-34 years old, White, Ontario, "homosexual") "I think the only thing that you might run into is that the definition, like, you have homosexual, bisexual, and then heterosexual. I think that the definition of bisexual is useful and accurate. I think that you might find some people don't identify with the word bisexual but identify with that state of being interested in men and women, or men and the people outside of male/female. And, you know, so that might be the only place that, um, could perhaps be tweaked. But, I mean, for most people that's going to make sense and it's going to be, uh, it's going to be clear."

Some participants also problematized the fact that the question was based on a cisnormative assumption. This was not only raised by trans and non-binary participants but also those who were cisgender, as shown here:

(Cis female, 55-64 years old, White, Western Ontario, "homosexual") "Homosexual is having sex with a person of the same gender identification as you. Because I could be physically a male, believe I'm a female—I mean, not believe, but be a female inside. And have sexual attraction to a cisgendered female. We're not the same gender."

Knowledge / Memory

No participants identified that there was a problem with knowledge / memory. They believed respondents will know the answer to the question and it is unlikely that one will not remember the answer to the question.

Response Categories

An overwhelming majority of participants reported problems with response categories. Even when they easily found their personal option in the survey, many still felt that it needs at least an “other” option. In particular, regardless of how they identified, many suggested adding the options such as “*queer*”, “*asexual*”, “*heteroromantic*” “*pansexual*”, and “*not sure*” which were all thought to be distinct from “*don’t know*”.

Interestingly enough, when participants did not find their personal identity listed as an option, no participants who were interviewed left the question blank. Participants generally told us that they would only leave a question blank if they found the question to be highly objectionable, which did not seem to be the case. Some told us that questions with radio buttons in online surveys seem to give the perception that one needs to complete it in order to move on. One cis woman who identified as queer but chose bisexual suggested that: “*if it said at the bottom, ‘If none of these fit, please move on’ then I would have just moved on because I don’t feel strongly about the identity that I chose.*”

A total of 17 (39.5%) participants found that they were not okay with the response that they had chosen. Some participants found the term “*homosexual*” to be offensive and pathologizing; it should be avoided as an option in a survey. This was supported by the finding that among those who chose “*homosexual*”, 50% felt that this category did not really reflect them, as illustrated in Table 23. The majority of those who chose “*don’t know*” felt that this option did not really reflect their identity, particularly for those who were genderqueer and non-binary, who felt forced to choose don’t know, as shown by the following quote:

(Genderqueer, 35-44 years old, White, Western Canada, “don’t know”) “I picked don’t know because it’s not that I don’t know. It’s just that none of those other options suited me. So don’t know was actually the most fitting option, even though it wasn’t really that fitting. It has the assumption of a—of a binary gender. And for somebody who can’t relate to any—to—a gender or a binary gender um, it doesn’t—you—you then can’t define sexual orientation along that.”.

Table 23: Frequencies of Participants who found the Option they chose to be Problematic at the Statistics Canada Question

Option Chosen	Response Chosen Problematic - n (%)	Total Participants
Heterosexual	2 (18)	11
Homosexual	7 (50)	14
Bisexual	3 (30)	10
Don't know	5 (63)	8
Total	17 (40)	43

Some of the cis women who chose bisexual or homosexual also felt this option did not really reflect how they feel, as they identified with other categories such as queer. “*Don't know*” does not capture these other identities, since they have a good understanding of themselves for being queer. They felt that they had to choose the best out of the worst. Others discussed that they did not really consider themselves to have a sexual orientation but they still chose an option, although they found it to be really frustrating:

(Genderqueer, 35 – 44 years old, Multiracial, Western Canada, “bisexual”) “I find that question really frustrating. I don't identify with any of those. I've never really felt I had a sexual orientation. So even while I understand the concept, it's never personally resonated. I've never had attractions to people based on their gender presentation or their body. So it's, like, because I have connections with people of all sorts of different kinds of bodies and genders, I put down bisexual. But to me that's really limiting. Yeah, I was kind of struggling with that because um, sometimes I shorthand to saying I'm gay because people understand that and because it's a little politically closer maybe to who I am. And then—and bisexual, I like it because there's—well, I think there's a lot of, like, actual biphobia and I like to fight that. Um, but it also feels limiting in that I don't usually um I tend not to date people who identify as either male or female. So it kind of feels like that doesn't quite fit. Um, so I was sort of struggling about which one to put there. But then I ultimately decided that probably for the purposes of your survey, bisexual would be a more accurate representation. But it still didn't feel super close.”

Finally, a few participants who chose the term heterosexual also found the option to be not reflective of them. They felt options such as “*mostly heterosexual*” would have reflected their identity better, as shown in the following quote:

(Cis woman, 35-44 years old, White, Maritimes, “heterosexual”) “I decided to answer that question um, by choosing heterosexual because that to me was most closely aligned with how I guess both identify, but also um, practice my sexuality. Um, yes, but I also felt that it was not um, entirely the way that I would have answered if I had more options. [...], if I remember correctly, there was a category that said, like, mostly heterosexual. And so I think to me that would be more uh, close to how I identify than bisexual because um, I don’t regularly engage in and at this particular time in my life I haven’t recently engaged in lesbian relationships. But I have in the past, and I’m not um, closed off to the possibility of it in the future. But I don’t—so I don’t kind of openly live as bisexual because that is just not the way that anybody in my sort of recent or current life would see me, with partners of different genders. So I think, well, it’s maybe a little bit disingenuous to claim bisexuality when that is not really how I’m regularly living my life. Uh, but at the same time, I don’t think that heterosexuality for me is something that is, like, completely, you know, locked down. Like, this is the only way uh, that I’ll ever engage in intimate relationships, would be with someone who identifies as male. So I—I liked the mostly heterosexual ‘cause I think, well, yeah, I mean, that—that represents how I experience my life. Mostly I’m heterosexual.”

However, some participants were satisfied with the option they chose, even though it may not have been the term they preferred. This was shown by the following participant who preferred the term pansexual but chose the option bisexual:

(Genderqueer, 25 – 34 years old, White, Prairies, “bisexual”) “Nope, bisexual was good for me. It did occur to me that there are people who would probably not want to answer bisexual. But I am fine with being bisexual, so that worked for me.”

While many who chose “*don’t know*” felt that the category was not reflective of them, some cisgender youth believe this is a good category that reflects they were, in fact uncertain, as shown in the following:

(Cis man, 14-18 years old, Ontario, Multiracial, “homosexual”) And I think that I probably would have been better with, like, don’t know. Just because, like, I’m more of, um – I have an idea of my sexual orientation, but I’m not a hundred percent – like, I’m not a hundred percent confident with it. It’s – so I feel like maybe like, um – it’s just like, um, with the label. I’m not a hundred percent sure whether or not, like, that fits me a hundred percent. Well, I’m just not a hundred percent – I am honestly just not a hundred percent sure whether or not, like, I’m fully a hundred percent homosexual. But like, um, that’s kind of the only reason because, like, um – it’s just kind of like sometimes, like, uh – like, sometimes, maybe, I have, like, thoughts about the other gender. But a lot of the times, it’s, like, about my own gender. So, um – so, like – so, like, that’s just kind of why, like, I’m unsure. But I – so I lean more towards, um, like, my own gender. Than anything else. Like, I know – I – the only thing that I kind of know for sure is, uh, like, I’m definitely not, like, a hundred percent heterosexual.”

Other Problems

Participants pointed out other problems such as that more questions should be asked that incorporates attraction and behaviour. One heterosexual male participant claimed that although he has only been with females, he is not only exclusively attracted to the opposite sex and there is nowhere in this survey for them to indicate this identity that he refers to as “*bi-curious*”. This was illustrated here:

(Cis man, 19-24 years old, Multiracial, Western Canada, heterosexual) “I think, like, I—I think the big thing is—it’s a really tough, I think, line between the idea of being straight but also curious about same—like, about same sex relationships? So that bi-curiosity, as well as, like, as well as, like, essentially, um, defining yourself as a bisexual person, uh, for someone who has, like, relationships for both members of, like, I guess, uh, for members of the same sex or the opposite sex. So, like, that’s—that’s kind of the only thing that I was just thinking about. And if there was, like, a—if there was a selection for the, uh, like, for the idea of just having, like, having a sexual attraction or sort of romantic attraction towards people of the same sex, then, like, I think that would kind of, like, hit the [goal] line for me.”

Trans people found it difficult to categorize themselves because they were not sure if they should answer with regards to the sex they were assigned to at birth or they should consider the gender they identify with, as shown in the following:

(Trans male, 25 – 34 years old, White, Prairies, “don’t know”) “Um, well, I mean, before I transitioned, I, for the most part dated men. So I mean, I was usually in straight relationships. Um, like, I’d always been attracted to women and that was something I was interested in. But I’d—like, I guess I knew I wasn’t gay, and uh, I didn’t want to be in a relationship with a girl who saw me as a girl. And that wasn’t what I wanted at all. So, like, I was towards the end of my female life, [laughs] I uh—I dated a few girls and yeah, I was just—it was weird I guess um, because they were, like, more like lesbian relationships I guess. They were expecting somebody who identified as female, and that was uh and since, like, I’m uh, engaged to a woman uh, that I don’t know. It’s kind of weird that it changed. Like, I feel kind of weird putting my identity as straight uh, because, like, I—it’s not that I’m specifically not attracted to other people. Like, I’ve mostly been attracted to women, but I mean, they’re—I don’t know, I’m somewhere between straight and bi I guess. On the Kinsey scale type thing, I’d be, like, you know, mostly straight. But yeah, as far as actually picking one of those labels, I would say don’t know just because, like, I wouldn’t consider myself to be bisexual. It’s not kind of equal opportunity.”

Other suggestions that emerged include a preference to have sexual orientation being asked in a continuum, such as the Kinsey scale. They believed this was more reflective of how the scientists had portrayed sexuality.

4.3.3 Commentaries on the SMART Guide Questions

Clarity

Similar to the Statistics Canada question, those who found the question set to be easy said they answered it with the “truth” and based on experience. Quite a few participants, particularly cisgender, straight women with no same sex experience found the sexual attraction question to be unclear. Many expressed that they can find women beautiful but may not want to have sexual relations with them, which made the question confusing for

them. This was also raised by some cis women who reported attraction to only males. No cis men who identified as straight made a similar remark of saying they can find men to be attractive without wanting to be in sexual relations with them. Even though the question did use the term “sexual attraction”, many of the cis women seemed to think it was unclear and difficult. One bisexual cis woman even claimed that it was weird to be asked to quantify one’s attraction. Some even felt the word sexual attraction should be **bolded** to make it clear what the question is asking.

Finally, a few participants also discussed issues of clarity in regards to reference time period for all dimensions. In terms of attraction, one cisgender straight woman suggested that the question could have asked: *“Have you ever been attracted to the same sex in your life time”*. She was unsure if past attraction counted in the current question and had the question been phrased that way, it would have been easier for her to say “yes”.

In terms of sexual behaviour, although the question was divided into past 12 months and life time, many felt it was still arbitrary and unclear what it was trying to capture, as shown in the following:

(Cis woman, 25-34 years old, Western Canada, First Nations, bisexual): “Yeah. Like what do you do, like what’s going on there? Like are you hoping for, you know, in your last committed relationship your last, like what, what information are they trying to get. If you’re looking for tracking maybe cyclical, cyclical sexual attraction then maybe five years would be more appropriate?”

On the other hand, others also felt that it is misleading because it was not providing accurate information on their sexual history:

(Cis woman, 25-34 years old, Multiracial, Western Canada, lesbian): “Yeah. I mean, well, with the first question, they would be kind of if we’re looking historically, I can’t say I’ve only had sex with women, but in the past ten years, then yeah, it would just be women. Um, but not in the last twelve months. Um, maybe because yeah, I guess that—’cause yeah, if I were to just look at that option, it would kind of seem like an ongoing thing, whereas for me, it was, like, something that occurred, you know, ten years ago and

then, you know, that's—it's something that, you know, you're not continuing on with the rest of your life, so it doesn't really—it to me doesn't really factor much into my sexuality or how I consider, you know, my sexuality would be, you know, something that occurred but also not something that, um, I think is indicative of my sexuality."

Finally, some also questioned the sexual identity piece, which was also assumed to be constant and may benefit from considering the aspect of "*temporality*", where one's identity may change through time, just like one's behaviour and attraction.

Assumptions

People seem to like the idea that the questions do not assume that one's sexual behaviour, identity and attraction always match one another. However, many believed that the questions still made assumptions of cisnormativity. This was not only raised by those who were trans, in fact quite a few cisgender participants raised this issue, they were unable to indicate the fact if their partners were trans, which was also discussed further in the response categories section.

Knowledge / Memory

Almost nobody problematized the questions based on knowledge / memory for themselves, but one participant believed that some of the questions in this set could be difficult for the general population. She felt that adding an explanation of what the terms mean in brackets could be helpful for some people.

Response Categories

Similar to the Statistics Canada question, many people still problematized that the options for the sexual identity question were limiting; some believed the identities presented were "*archaic*". Many also problematized the response options in the other questions; they were considered to be cisnormative and one participant called them "*binary and reductive*". One cis woman explained how none her responses were truly reflective of herself, as shown in the following:

(Cis woman, 25-34 years old, White, Prairies, gay / lesbian)

Sexual Identity: “Gay / Lesbian” *(not true, she actually identifies as queer)*

Lifetime behaviour: “both men and women” *(true but includes trans man)*

12 months behaviour: “Men only” *(again, this is actually trans man)*

Attraction: “Mostly females” *(not really true, in general, she is attracted to masculine women or trans men).*

One also described that all of these questions assumes that they know the gender of their partner but how they interpret their partner’s gender may not necessarily match with how the partner identifies their own gender. Some participants suggested that providing an open ended response would help, similar to how others suggested adding an “other” option to the Statistics Canada question.

While participants felt the options in the sexual attraction question did not truly capture their experience, many had difficulty in articulating how to best ask a question on sexual attraction. However, depending on the purpose of the study, some do believe that this question should be asked in surveys, especially this was preferred over assuming one’s identity and attraction always match one another, as described below:

(Genderqueer, 25-34 years old, Prairies, Multiracial, bisexual) “Um, sort of going with the spirit of what I perceived the question to be, rather than what the—than what captures, like, the nuance of my attraction. So I’m primarily attracted to, like, men and masculinity and androgyny. So there’s certainly—like, I would say I feel that it’s complicated to assign gender categories to attraction because I don’t necessarily know what a person’s gender is. Um, I can sort of—I—I guess I can, like, apply genders to gender presentation or to certain um, expressions of, you know, masculinity or femininity. Um, but uh, yeah, I feel like it’s a very limiting question the way the—the options were given. And so um, yeah, I uh—I would prefer it to—to be phrased in a different way that is, again, more inclusive of um, people who are androgynous or non-binary or um, you know, yeah, whether it’s non-binary in their identity or non-binary in their presentation.”

In this set of questions, there seem to be fewer participants who found the response option they chose to be problematic. This might be because participants were able to provide more information about their sexual orientations, in spite of not having the exact identities to describe themselves. The breakdown is shown in the following Table 24:

Table 24: Frequencies of Participants who found the Option they Chose to be Problematic at the SMART Guide Sexual Identity Question

Response to Sexual Identity	Response Chosen Problematic - n (%)	Total Participants
Straight	1 (6.7)	15
Gay / Lesbian	3 (42.9)	7
Bisexual	4 (36.4)	11
Don't know	0	3
Total	8 (22.2)	36

Other Problems

A few participants raised the topic of sexual abuse. One genderqueer participant left all four questions blank before the interview and discussed that it was because their sexual experiences had been non-consensual; thus it made the participant unsure of how they should answer the questions. This also occurred for a heterosexual cis male participant with an attraction to females only who reported that he has had sex with both sexes in their life time but not in the past 12 months. He disclosed during the interview that this was due to a childhood sexual abuse, rather than consensual sex.

4.3.4 Commentaries about General Sexual Orientation Questions

In general, an overwhelming majority of participants agreed that at least one of the multiple dimensions of sexual orientation was relevant to health research, with the exception of one straight Muslim youth who felt that sexual orientation questions made her uncomfortable due to her culture and religion prohibiting anyone to become “the other options”, which she also disagreed with. Others have also reiterated the idea that religion plays a role in the acceptance of sexual orientation. One Christian participant suggested that homophobic attitudes still occur in her church even in very recent

sermons, which she described to be very sad, *“as if they’ve gotten a message directly from God giving them permission to condemn people.”*

One heterosexual participant of Asian descent did not know what the word sexual orientation meant, although this did not lead to a problem of comprehension. The term “sexual orientation” did not appear in the question and he was familiar with terms used in the response options. While other participants know what the term is, other non-white participants, such as a few Black and other Asian participants have discussed the idea that this was less accepted in their culture and there was no choice for them other than to be straight. They even discussed if one tries to deviate from this straight culture, people in their home countries will pray for you and in certain cases *“people will beat you up”*.

When participants were asked the best ways to ask about sexual orientation, many suggested that adding an explanation of why the questions were asked will encourage people to become more truthful rather than being afraid of disclosing their sexual orientation or thinking that it is *“none of your business”*. One participant suggested putting an explanation such as *“Studies have shown same sex households receive income disparities. Hence, we need to ask this question to better understand this pattern in the population.”*

5 DISCUSSION

This chapter will provide a more thorough discussion of the results, the study's strengths and limitations, possible implications of the findings and recommendations for future studies.

5.1 Summary of Findings

5.1.1 Analysis of Loss to Follow Up

As one would expect, given the topic of the study, those who were sexual, gender and racial minorities were significantly more likely to complete the interview. This might be because the LOI and demographic questions did give the impression that this was what the study was about, although participants were never told the details of the interview in the email invitation. There were no demographic differences between those who completed the follow up questions and those who did not, which minimized potential biases from our analysis. However, it is likely that there are other possible unmeasured confounders in the study, as discussed further in Section 5.2.

5.1.2 Sensitivity and Specificity of the Statistics Canada Measure

Our results support previous findings that a single item sexual orientation question seldom misclassifies heterosexuals as a sexual minority⁵⁸. As expected from the literature on sexual orientation discordance and sexual fluidity, we also found that a single item question was insufficient to capture sexual minorities by the broadest definition. Similar to past findings, many of the discordances between the Statistics Canada question and the overall broadest definition of sexual minorities occurred among heterosexual women who had been with both sexes in their life time; a few had also been only with women in their life time. Only two men fell under this misclassification.

The Statistics Canada question has a near perfect sensitivity and specificity in capturing sexual minority identity based on the SMART Guide question, which was not defined behaviourally. This provides support for previous studies that have interpreted this as a sexual identity question. On the other hand, there was a much lower specificity in capturing the past 12-month behaviour, which was caused by those who identified as

bisexuals but had only been with the opposite sex in the past 12 months. This was supported by past research on behavioural bisexuality, where classifying bisexuals based on their past year behaviour is a poor proxy⁵⁹. Finally, a few misclassifications that resulted in decreased sensitivity in capturing minority attraction occurred among those who identified as heterosexuals but indicated attraction that was “*equal to both sexes*”. Specificity was even lower in this domain and primarily driven by those who indicated an attraction to “*mostly the opposite sex*” but identified as bisexual. This provides further support to the idea that there exists large heterogeneity within those who reported attraction to “*mostly the opposite sex*”, with some reporting heterosexual identities, while others reporting bisexual identities³⁷.

We have found that a single item sexual orientation question with a behavioural definition results in a differential misclassification that potentially results in an underestimation of sexual minorities from the broadest definition. A single question was also missing on the heterogeneities among sexual minorities who may have been heterosexual on some dimensions, such as a bisexual person who has only been with the opposite sex in the past 12 months. Furthermore, the degree of misclassification in this thesis could be an underestimation since we coded those who have not had sex, do not know their sexual identity and unsure of their attraction as unclassifiable.

Interview results provided similar support to the findings that the single item question is insufficient to capture the heterogeneity of participants’ sexual behaviour and attraction. Consistent with the literature, many youths from all sexual identities have not had sex and this is never captured in the Statistics Canada question⁸. Some heterosexual women also discussed that while they have not been with the same sex for the past 12 months, they did not want to close off this possibility since they had also been with women in their life time. In terms of attraction, one of the most common themes that were not captured by the single item question from Statistics Canada was the fact that many heterosexual women have expressed that they can be attracted to other women, which is also supported by the literature⁵⁵. Almost no heterosexual cis men made a similar remark, which might be due to traditional heteronormative expectations that were stricter on men expressing interest in other men compared to women expressing interest in other women.

Some participants have also stated that this may have been due the higher sexualisation of female bodies in the media which may make women being considered as more attractive by both genders. Among interviewed participants who were raised in a culture that prohibits same sex attraction, a few who are heterosexual but acknowledged same sex attraction discussed that such attraction can be a source of anxiety for them. This supports the idea that a question on sexual attraction could be relevant for identifying health disparities, even among non-youth.

We also found that using the broadest definition of a sexual minority that was devised, no trans people were classified as heterosexuals. The literature suggests that many trans people do identify as a sexual minority, although a few do identify as straight^{70,121}. In our sample, we had a few trans people who do identify as straight, but they were classified as a sexual minority or unclassifiable based on the other dimensions. This also occurred because many of them have not had sex in the past 12 months, which has been found from past studies¹⁴⁹. It is common for marginalized populations to be more anxious and hence less likely to engage in sexual activities¹⁴⁹.

Furthermore, among trans people, we were unable to interpret results involving life time sexual behaviours. This was challenging particularly when they have had sex with both sexes. It was unknown if they had sex before or after they transitioned to the gender they identify with, or in certain cases if they have not transitioned. For trans people, it is also difficult to interpret the findings since if one answers as male or female to the question, it is unknown if they answered this based on the gender they were assigned at birth or the gender with which they identify. From the one question alone, we were unable to tell if a person had transitioned, and we were unable to assume the presence of certain body parts. These problems arose from the fact that our current idea of sexual orientation and the questions being asked to assess it were still tied to cisnormative assumptions.

5.1.3 Concordance between the Statistics Canada Question and the SMART Guide Questions

Complementing results of sensitivity and specificity of the single item question, our concordance analysis further strengthens the idea that the Statistics Canada question was

considered as a sexual identity question. Albeit not a perfect agreement, it has a high overall chance corrected agreement with the sexual identity question from SMART Guide. The question works very well as a sexual identity question among cisgender people, and slightly less among trans people. This was contrary to our expectations; participants still selected the identity that best fits them even in cases when the behavioural definition does not match their actual behaviour. Behavioural discordance with sexual identity did not lead to one reporting “don’t know”; those who selected “don’t know” to the Statistics Canada question chose it for other reasons. Interview results also complement this, since only a few participants problematized the behavioural definition in our interview.

Findings also strengthen the fact that this question should never be used to determine an individual’s sexual behaviour. Participants’ responses to the Statistics Canada question were not reflected in their life time nor past year behaviour, with a low chance corrected agreement for both cis and trans people. The problem is more pronounced among those who are trans since the agreement with lifetime sexual behaviour is zero, which suggests that any agreement may have occurred by chance alone. The low agreement with the past 12 months behaviour could be due to many trans individuals have not having had sex in the past 12 months¹⁴⁹. Trans people may also have had sex with both sexes in their life time, especially if they have lived as another gender and has nothing to do with their current sexual orientation identity.

Finally, our results also confirmed previous findings that the “*mostly*” attractions are more similar to their closest respective categories (either heterosexual or homosexual) than to bisexuals^{41,42}. The Statistics Canada question has a moderate agreement with sexual attraction; majority of the misclassifications occurred among those who identify with a gender that is not “male” nor “female”. They were unclassifiable and had no respective classification on the Statistics Canada question. Discordance also occurred among those who chose “*not sure*” as their attraction, since not all of them responded with a “*don’t know*” to the Statistics Canada question. This highlights the importance of asking a sexual attraction question, which has been shown in the literature to be preferred by many youths. The complexity of one’s attraction and identity was also illustrated in

our interview, where many had described their attractions to be more complicated than just males and females. Some described attraction towards masculinity, femininity, androgyny or even intelligence.

5.1.4 Association between Demographic Characteristics, Sexual Identities, and Sexual Minority Classification

As shown in the literature, there were more women who identified as bisexuals than those who identified as lesbians, while more men identified as gay than bisexual in our sample. However, interviews also revealed that some preferred other terms that were not listed as an option. While the degree to which they were comfortable with the option they chose varied, this also provides further support for the literature that many of these labels were outdated, which was expressed by individuals from all ages.

In the current sample, ethnicity was also found to be significantly related to responding as a sexual minority to this question. Particularly, those who were white and those who were Aboriginal were both more likely to respond as a sexual minority compared to those who were racialized non-Aboriginal. This was also supported by our interview results and confirmed existing literature that some racialized individuals who grow up in other cultures are still prohibitive of sexual minority behaviours and identities. From our interview, a few Black immigrants discussed that sexual orientation identities may still endanger people's safety in some parts of Africa. Other people of colour participants also discussed that the concept of "gay" was foreign before they came to Canada; one Asian participant did not even know what the word sexual orientation means.

As we expected, the same demographic characteristics (such as religion, ethnicity and youth status) were also associated with one's sexual minority status from the broadest definition. In our study, we found that Aboriginals were more likely to be classified as a sexual minority, while racialized persons of colour were less likely to be classified as a sexual minority, both compared to those who were white. This was actually contrary to previous unpublished CCHS data where there were fewer Aboriginals who identified as a sexual minority.

We also found that youth were more likely to be “*undetermined*” in their sexual minority status than their non-youth counterparts. This may have been because many of them have not had sex or were more unsure of their attraction and identity which was also found in other studies⁸. Results also demonstrated that those who were religious and somewhat religious were less likely to be classified as a minority than those who were not religious. This supports previous findings on how religious individuals were less likely to identify as a sexual minority, which was also supported by our qualitative results. One religious Muslim participant indicates that sexual orientation questions made her uncomfortable. Finally, we also found education to be associated with being classified as sexual minorities. However, this was found in the opposite direction from past literature, where more of those with education less than a post-secondary graduation were classified as a sexual minority than those who have had a post-secondary education^{58,118}. This may have been caused by the selection bias in the study, as discussed further in Section 5.2.

5.1.5 Identifying Demographic Characteristics of Those who Were Unclassifiable

Our results suggested that there was a very strong association between those who responded with “*don’t know*” to the single item Statistics Canada question and those who identified as trans. Those who did not identify as males or females were also more likely to respond as “*don’t know*”, both compared to those who identify as males or females.

Interview results also reflected this, where many trans participants questioned if they should understand their orientation based on the gender they were assigned to at birth or based on the current gender with which they identify, confirming results of previous studies. For genderqueer or other non-binary individuals, many of them answered “*don’t know*” because they did not identify with any of the categories. The terms “*opposite sex*” and “*same sex*” were particularly problematic for them since they do not identify with either gender. While “*don’t know*” responses were not significantly higher in terms of other demographic variables, some cisgender individuals did respond as “*don’t know*” as well. Interview results also reflected this, where some young cisgender participants particularly endorsed the categories “*don’t know*”, since they were still in stages where they were unsure and still figuring out their sexual identity. However, youth status was

not found to be significantly associated with responding as “*don’t know*”. This also confirms previous findings that in spite of the belief that many adolescents today no longer identify with these categories, past survey results do not reflect this¹⁵⁰.

We also found a higher proportion of “*don’t know*” responses to the SMART Guide identity question than those found in the Statistics Canada question, although the difference was not statistically significant. It seemed that this was because they were able to see that there was more than one question that was asked, which allowed them to provide more information about their attraction and behaviour without having to commit to an identity. On the other hand, given the limiting single question from Statistics Canada, they felt that they had to choose an identity even though they were still figuring out their identity or may not identify with any of them. Our interviews also supported this finding, where one youth responded as bisexual to the Statistics Canada question but chose “*don’t know*” to the SMART sexual identity question. He explained that he responded “*don’t know*” to this question because the thought of being with the same sex has occurred to him, but he is still unsure of his identity.

There were a higher number of “*undetermined*” responses from the SMART Guide question compared to the Statistics Canada question, which was approaching significance. However, this was primarily due to the participants who have not had sex, which was also found to be higher among youth. On the other hand, when we only observed a difference between sexual attraction and sexual identity, there was a statistically significant difference, where there were higher unclassifiable identities compared to the number of unclassifiable attraction, indicated by a “not sure” response. This suggests that adding a sexual attraction question would help understand participants who were unsure of their identity, which has also been shown to be preferred among youth^{10,39}

5.2 Strengths and Limitations

There were many strengths and limitations of the study due to the unique methods and study design. The following section discusses the various limitations and strengths of the current study.

5.2.1 Limitations of the Study

Sampling Strategy & Generalizability Concern

As has been discussed throughout the thesis, one major concern in the study is generalizability due to the electronic snowball sampling strategy that originated from researcher's networks. The convenience sampling led to selection bias that may have explained some of the findings that were conflicting from previous studies (e.g. people from lower education were less likely to be classified as a sexual minority or Aboriginals were more likely to be classified as a sexual minority). Given that the LOI discussed about sexuality and ethnicity; Aboriginals who were sexual minorities were probably more motivated and more likely to respond to our online survey. This was also shown in our preliminary analysis, where those who were ethnic and sexual minorities were also more likely to complete the interview. Other factors such as differential efforts in recruitment may also have contributed to the selection bias. For example, to find certain demographic intersections, we contacted LGBT youth groups across Canada. This could have caused the higher proportion of sexual minorities with a less than post-secondary education since many of these youth may not have graduated from a post-secondary institution.

While our recruitment method helped reach the desired variation in demographic characteristics, our strategy may have introduced biases where the participants who were from a majority group (such as heterosexual cisgender white men) were not representative of the population. About 75% and 99% of our sample knew someone who is transgender and someone who is LGB respectively, which was much higher than past studies. Only 22% of adults in the US know someone who is trans¹⁵¹ and 77% of adults know someone who is LGB in Canada¹⁵². Our samples were also much more educated than the average Canadian population. About 83.7% of non-youth (aged 25 or above) in our sample have completed a post-secondary education, which was much higher than the national average of 64.1%¹⁵³. We hypothesized that there might be even more problems with these questions among those with lower education and less connected to the community, which highlights our findings even further.

Just like the CCHS, our survey also excluded some members of the population, such as full time members of the Canadian Forces and institutionalized populations⁹¹. We were also unable to generalize results to Canadian residents who do not speak English, those with reading disabilities, and those living in Northwest Territories, Nunavut, Yukon and PEI since we have no participants from these regions who completed the follow up. Unlike the CCHS, we may have included some Indigenous persons living on reserves, since we did not exclude them directly. For some of these excluded populations, results might be different; as an example, there might be higher misclassifications among those with reading disabilities.

Other than these biases we have identified, there were possibly other unknown residual confounders due to the convenience sampling mechanism. Snowball sampling recruitment may have caused confounding since associations observed could be due to the fact that participants were more connected to the LGBT community rather than due to their socio demographics belonging. Those who were recruited through Facebook may also be different from those who did not have Facebook, although past studies on sexual minorities and other populations had shown that those recruited from Facebook were not different from those recruited in person^{128,129}. All proportions and study findings must be interpreted limited to the study sample. This holds true for both concordance analysis and the association of demographic characteristics with the ways participants respond to the questions. Kappa statistics are also dependent on true prevalence on the population and given an unrepresentative sample, a low Kappa may not always mean a low reliability in the actual population¹⁴⁵.

The same limitation does not hold for the measures of sensitivity and specificity. Unlike measures of Positive Predictive Value (PPV) and Negative Predictive Value (NPV), they do not depend on the prevalence of the sexual minorities in the actual population¹⁴⁴. However, the calculation for sensitivity and specificity in current study excluded those who were undetermined in their sexual minority status. This still limits generalizability since these findings may only apply to those who know their sexual identity, are certain of their attraction and those who have had sex. Hence, this analysis may have

overestimated the performance of the measure since the unclassifiable individuals were those who were facing more problems with the question.

The proportion of those who declined interviews was actually higher than those who responded. While our analysis suggests that they were not significantly different other than in terms of their gender, sexual orientation, and race, they could still be different in other characteristics that were not accounted for in the study. This might be problematic since many of those who declined the interviews and refused to provide their contact could be the ones who were more anxious in talking about these issues, more unsure of their identities, more depressed, more homophobic, or have had a negative experience when discussing these issues. They may also be the ones who found these questions to be very objectionable and had troubles answering them in the first place. Some might have decided to close it out of anger; some might refuse to do a follow up or refused to provide their contact due to finding the questions so objectionable. This was actually apparent from the interview, where some people actually told us they really hated the first questions they received. A few participants even emailed us to clarify how some of the questions were not inclusive of their identities and unable to choose the options available. It is unknown to what degree has this impacted our study and how many of those who were having troubles with the questions did not complete the survey or were lost to follow up. Unfortunately, these individuals who were excluded may be the ones who perceive more benefits from our findings.

Limitations due to the Measures

Measures used in this study were imperfect and had their limitations. The questions on sex, gender, race and ethnicity have not been widely used and the current study was the first one to test them. As we found in our interview, our measure of gender that asked “Are You?” with options of “Male”, “Female” or “something else” were self-identified; some may interpret it as gender and others interpret it as sex. Furthermore, from the current study, we have found that participants who are genderqueer or non-binary do not always choose a gender that is other than males or females. Interviews also revealed that although participants might have a certain ethnic heritage that they checked off in a

survey, they may not identify with this particular ethnic group, which highlights the importance of distinguishing one's cultural identification from one's racial background. Even for measures that have been widely validated, we did encounter some problems. For instance, one interview participant discussed that she went to university although in the initial survey she indicated that their highest education was some elementary school. Limitations of these measures limit the interpretation of how findings on different demographics such as sex, gender and ethnicity affect sexual orientation in this study.

Limitations in Selecting Interview Participants

There were limitations in the way we have selected participants for the interview portion. To understand how different variables affect one's response and understanding of sexual orientation, we selected interviewees based on a maximum demographic variation. As discussed, some of the measures used to ascertain their demographics were imperfect themselves. In addition, some questions were also asking a different construct from what we were intending to understand from participants. For example, in understanding how geographic location influences one's understanding of sexual orientation, we asked participant's current postal code. This was proven to be insufficient since it was only measuring current residence which was very limited in shaping participant's understanding of sexual orientation. They might have grown up elsewhere and this was never captured in the survey. The same goes for religion, where current religion is a poor measure in shaping one's experiences of sexual orientation. It is especially common for sexual and gender minorities to grow up in a religious background and then decide to no longer practice it or identify as an atheist or agnostic. But there are still strong religious influences that might be affecting the individual. Once again this was never captured in the survey. This has been found in studies regarding biphobia, where children's religiosity was argued to be the one that will shape their attitudes, rather than current religious affiliation¹⁵⁴. In retrospect, understanding childhood religiosity and different places participants have lived could have been beneficial for the study. While the actual religious background and place of residences that participants have occupied were discussed in the interview, this limits the way participants were selected for interviews.

They were chosen based on their current religion and residence, which may have no role in shaping their sexual orientation.

Other Concerns

There were very few who skipped questions in the study, in spite of many claiming that none of the options worked. This was also lower than rates expected from other large population surveys⁹⁷, which may have been due to the LOI not clearly stating that participants were able to skip questions. While they were aware that participation was voluntary and they were able to leave the survey at any time, there were no indications that the system will let them proceed if they did not complete all questions. As one participant asserted, “*Questions with radio button gives you the sense that you have to pick one option before proceeding to the next question.*” Furthermore, given such a short survey, participants were probably more reluctant to skip a question even if they hated it, compared to the much longer form in the CCHS. This also posed a similar generalizability concern if our findings hold in the CCHS survey, which was much longer and conducted as a telephone interview.

Some participants also did not adhere to our instructions to fill the questions at the beginning of the interview, a few ($n = 2$) completed them long before our interview started. A few participants also did not have a computer in front of them and we had to read out the questions to them, which made it even more challenging to keep situations consistent for participants to answer these questions.

5.2.2 Strengths of the Study

A major strength of the study is being the first mixed methods study that evaluates these questions on Canadians. The design allows us to understand reasons for why participants responded the way they did, which were not available from CCHS survey alone. No studies have done this on a similar scale with a wide variety of demographic variation in Canada; backgrounds such as religion, immigration status and ethnicity were often ignored in population studies of sexual orientation. Most of past qualitative studies have also only tested sexual orientation questions on groups of sexual minorities recruited

exclusively from a local convenience sampling from LGBT organizations, which was not the case in current study. Although inferences may be limited due to the sampling strategy, this still provides an initial evidence to highlight the existing problems with the current way of asking these questions.

The study has established the first confirmation that past studies have correctly interpreted the findings that the Statistics Canada question does measure sexual identity. No past studies to our knowledge have evaluated a single item sexual orientation identity question that is defined behaviourally.

Even though this was a preliminary finding that may not be replicable on a nationally representative scale, we also identified several demographic characteristics that may influence how one responds to these questions, such as trans status, youth status, ethnicity, religiosity, and education. Some of the measures such as trans status and religiosity were never asked on the CCHS and hence this finding is always invisible from CCHS data. The findings further highlight the systematic difference between each of these subgroups who may not be captured from these questions and should be further investigated in future studies.

5.3 Implications

For Interpreting Statistics Canada Data

Our findings have suggested that the Statistics Canada single item question is not to be interpreted as encompassing of all sexual minorities by the broadest definition. This may explain the low proportions of sexual minorities observed in CCHS surveys, where 3% identified as gay, lesbian or bisexual¹⁵⁵. While this rate did not differ from the proportion of those who identified as sexual minorities in the US⁸⁹, latest NSFG survey of 18 – 44 years old in the US found that up to 20% of women and 7% of men reported behaviour or attraction that was not exclusive to the opposite sex⁸⁹.

The Statistics Canada question can be interpreted as a sexual identity question and not to be interpreted as a sexual behaviour question. We also observed that many who did not identify with any of the available categories would still choose one out of the three

available categories, even if they disliked all of them. This may also suggest that one could interpret this question as those who “roughly identifies” with the category. For instance, findings regarding those who are bisexual can be best conceptualized as those who roughly or have identified as bisexuals. As the literature on sexual fluidity have discussed, many individuals who endorsed these other categories such as pansexual and queer have claimed that these categories were learned and may have started with more traditional categories of bisexual, gay or lesbian. Hence, one may also interpret this as those who may have used these categories ever in their life. Since the purpose of population surveys is to understand the disparities that exist in the population, rough identification may still be useful to obtain patterns of health inequities in Canada.

For possible revisions

More than half of interviewees suggested that the Statistics Canada question required revision and majority suggested to adding at least an “*other*” category. However, this may cause problems in terms of analysis. Surveys such as the CCHS are conducted annually to understand patterns of health within different demographic groups across time. Adding new categories may make results incomparable and lead to interpretation problems. Not all that do identify with other categories would have selected “other” even if such an option was present¹⁵. Furthermore, as we have observed in our interview and based on previous studies, when presented with an “other” category, many participants (up to 30%) would have selected an “other” category⁵⁷. This could lead to a large decrease in the number of homosexuals and bisexuals, followed by a large increase in “other” which may be uninterpretable. An “other” category may also cause problems since as we have observed, “other” does not only comprise of sexual minorities such as “pansexual” and “queer”, but it may also include those who are “mostly heterosexual”, “bi-curious”, which may not necessarily be considered sexual minorities. There is too much heterogeneity in the “other” category and it may not be in the best interest of population research to collapse everybody under the term “other”. This also may cause results to be uninterpretable. For instance, what does a disparity between those who identify as “other” and bisexual mean?

To better understand those who were not captured by the three options, one may also consider asking the different dimensions of sexual orientation by adding sexual behaviour and sexual attraction questions, as has been done in the SMART Guide questions. Our data also supported this since there was a significantly lower proportion of participants who claimed there were problems with “response options” in the set of questions from SMART Guide even though the response options for sexual identity question in both sets of questions were very similar. This would not interfere with the comparison to past year’s data and allowed for a more refined interpretation. As discussed in Chapter 2, complex interplay in the health risk of individuals with discordant identities, behaviour and attraction had been documented, which will never be understood from the current CCHS survey. It will be beneficial to obtain this information at a population level in the Canadian context. Based on the current questions available, CCHS data are unable to be used to identify factors related to outcomes such as HIV transmission, or minority stress due to being a sexual minority. Statistics Canada have planned to add a new sexual behaviour question in the latest CCHS cycle in 2015 – 2016, although data has not been released yet¹⁵⁶. To our knowledge, there are currently no plans in adding a sexual attraction question now or in the near future.

In addition, we have seen that there is heterogeneity within this group of participants who responded as “don’t know”; their reasons for answering “don’t know” vary from one another. We recommend to consider following up on those who choose “*don’t know*” or refuse to answer, by asking them reasons for their “*don’t know*” or refusal response. The format can be done in a similar way to the one done in NHIS (see Figure 1 in Chapter 2), since those similar reasons were the ones discussed by our interview participants. The proposed method will allow them to be reclassified into the proper category without interfering with data quality. In addition, the practice also promotes inclusivity since people can understand that their “*don’t know*” response would not be thrown away, which has been described as a concern for some of our participants. Our interview results found that those who chose “*don’t know*” were indeed those who did not fit with the other three available options, such as those who identified as asexual, questioning, or those who were trans and genderqueer. On the other hand, many who identified with other

categories such as pansexual or queer would have selected other options such as homosexual and bisexual.

As supported by the literature, a few participants have also discussed that the term “homosexual” is overly clinical and has pejorative connotations. It may also be best to consider removing this term from the option and instead just use the term “*gay or lesbian*”, as done in the sexual identity options presented on the SMART Guide.

Some participants also suggested that an open ended response for everything will be more preferred. This is certainly unfeasible for logistical reasons and cumbersome for both participants and researchers; in addition to posing similar interpretation problems discussed earlier if an “other” category is suddenly added. A few also suggested the idea of asking sexual orientation as a continuum, rather than with multiple categories, which they believed was more aligned with how science portrays it. This could break the purpose of identifying groups that are experiencing health inequities in the population. On the other hand, as we have observed in the literature and our study, there were a growing number of individuals who identify as “*mostly heterosexual*”, or at least not as exclusively heterosexual. This is more similar to the idea of sexual orientation as a continuum that has been proposed by some participants. Studies have even shown that this group experience a unique health risk that is different from those who are bisexual and exclusively heterosexual⁴¹. However, this has not been done by other population surveys and again will make it challenging for interpretation. At present, adding the “mostly heterosexual” option is not necessary.

While an “other” category and having an open ended response for everything may not always be feasible, findings suggest that one may want to change to question of sexual identity as “Which of the following *best* describes you?”, rather than “Do you consider yourself to be”. The term *best* can be *italicized* or **bolded**, to emphasize, just like how many have asked to emphasize the term “sexual attraction”. This may ease participants who feel uncomfortable with the category they choose to select a category that *best* fits them, rather than a category that they consider themselves to be.

There are also questions on whether or not the behavioural explanation in brackets should be removed; opinions have varied across participants. Some interviewees brought up the fact that one's identity may not match their behaviour, while a few others actually said that they like the explanation of the identities since some people may not understand what these terms mean. Almost all participants have discussed that sexual orientation is to be understood as their sexual attraction rather than behaviour. Should the definition of each identity be kept, perhaps it can be described in terms of attraction rather than behaviour.

Finally, participants have also suggested that it may be beneficial to explain why such question should be asked. This is also supported by the literature on survey research that suggests adding a premise about the purpose of a question makes it less objectionable⁹². Many people feel that these questions are private and none of the government's business but if people could understand its importance, they may become more motivated to be truthful. Some even believed that their responses could be thrown away simply because of their identities. It is recommended that a brief description that explains disparities among sexual minorities have been observed can be added as a rationale for why the question is asked.

5.4 Future Research

Being the first study that examines the complexity of sexual orientation in the Canadian population, future studies may want to examine this further. The quantitative portion of the study can be replicated on a more representative sample of Canadians to better understand who were systematically excluded and underrepresented by this question. This can be done from the CCHS data, particularly with the new addition of sexual behaviour questions. Upon release, an analysis needs to be conducted on the latest 2015-2016 CCHS data to understand health patterns among those with same sex partners, which has never been available at the population level in Canada.

While the CCHS surveys would have the most representative samples of Canadians, it has the drawback of not having enough participants from the minority groups, such as trans people, who are invisible in those surveys. If future studies are to be conducted, we recommend other methods of recruitment to reach those who may feel that the study does

not concern them. We found that our generic advertisement calling for “all Canadians” (as shown in Appendix A) was ineffective. With ethics approval, one may use a more creative method such as explaining that the study is about something other than what it is studying, which was proven to be successful in a past study with a similar objective⁴⁰. One may also add more questions to make the survey slightly longer and more engaging; things such as income could be asked to confirm past studies that found those who skipped these questions also tended to skip other more private questions.

Furthermore, we have found that all of these questions still make assumptions on cisnormativity, where both sexual behaviour and attraction questions still assume that one’s partner is cisgender. Currently, no available measure to our knowledge has addressed this issue and future studies may want to further examine how to best incorporate trans people into a sexual orientation question. Certainly, the first step would be to first identify those who are trans, which currently in itself is still impossible given the binary male / female questions in the majority of population surveys.

As has been discussed, future studies also may want to address the issue of temporality, where one’s sexual orientation identity may change. Currently, all sexual orientation identity questions assume constancy or at least assume that one responds with their current identity, but a time period has never been addressed in any interpretation. Given that many participants do not even consider the categories they have selected as representative of their current identity, future studies may want to explore better ways to address the issue of temporality in asking sexual orientation identity questions. It is currently also not well understood if their response are representative of their present identity.

At this stage, adding an “other” category is not recommended, in spite of participants’ enthusiasm for this, due to the high heterogeneity in this “other” category. However, as per our recommendation, one may want to study the feasibility of following up those who chose “don’t know” like how it was done in the NHIS, which has been proven to be effective. Future studies could also investigate if it is actually “safe” to combine those who have less traditional identities (such as queer and pansexual) with those who

responded as bisexuals and homosexuals. It is also unknown what is the actual proportion of those who responded as “bisexuals” and “homosexuals” actually do not identify with these categories. Our interview results that are restricted to our samples indicate that those who do not identify with the category chosen reached up to 50% and this was most problematic among cisgender women. More recent studies on a convenience sample have shown that those who do not identify with the traditional categories may possess different health risks from those with bisexual, gay and lesbian identities¹⁵⁷, but studies at the population level have never been conducted. As discussed, adding newer emerging categories such as “mostly heterosexual” are also not necessary at present. However, this could be considered in the future once more studies that examine the validity of this category at the population level have been done.

Just like past studies, we did not seem to replicate the common idea that most teenagers no longer identify with these traditional categories and avoid labelling themselves. It may be helpful to further examine this emerging trend. One can investigate if this idea is restricted among those who do grow up in North American with a more liberal environment where they learned that homosexuality is acceptable.

There also exists the issue of a potential systematic underreporting that needs to be addressed. In the only one interview we had with an NGI MSM, we actually found that his experiences with males were actually the results of sexual abuse. This may not be generalizable to the population since literature has documented that there are NGI MSMs who voluntarily have sex with the same sex¹⁵⁸. However, this also raised the idea that there exists heterogeneity even within this group of NGI MSM. It is unknown if our underrepresentation of NGI MSM is the result of our sampling mechanism, systematic underreporting, or due to the fact that they were simply more aware of their discordance given the questions on identity and behaviour were presented together. One recent unpublished study showed that up to 30% MSM would refuse to disclose their sexual orientation in government forms¹⁰⁰. It is unknown if this holds true for sexual behaviour but perhaps among NGI MSM with discordant behaviour, this rate of underreporting could be even more inflated. More studies should examine the best ways to address the systematic underreporting within this group and encourage more truthful responses.

As has been discussed throughout, it is important to ask relevant questions depending on the purpose of the study. It needs to be emphasized that our recommendations are directed for population surveys that are used to identify sexual minorities in the population. Depending on their purpose, other studies may want to ask more questions or even word the terms differently from what was suggested here. For instance, a study that is aimed at understanding the various identities held in the sexual minority population will need to include newer sexual orientation labels. On the other hand, a study that focuses on the spread of STIs may want to ask more specific sexual behaviour questions. Such study could ask if the sexual experience constitutes oral sex, anal or vaginal penetration and if ejaculation was involved. For understanding outcomes such as minority stress and anxiety, it may also be relevant to understand one's visible outness and how others perceive one's sexual orientation. While this is not the focus of this thesis, these questions can be of importance in the population, especially in certain places where sexual minorities are still experiencing discrimination. To our knowledge, currently there are no validated measures that distinguish a person's sexual orientation identity from the one that society perceives the person to be. It could be of interest to future studies to develop such constructs.

In conclusion, these findings call for future studies to further examine the best way to address the different concerns over this single item question and replicate the study with a more representative sample of the Canadian population. It also raised the question of how findings regarding sexual orientation should be interpreted and a more refined measure that addresses the current limitations discussed may be necessary to be developed. This will allow for a more nuanced and accurate analysis of health inequities, which have the potential to lead to better public health policies and practices and improve understanding of patterns of health in Canada.

References

1. NHIS. *National Health Interview Survey: CAPI Manual for NHIS Field Representative.*; 2006.
ftp://ftp.cdc.gov/pub/health_statistics/nchs/Survey_Questionnaires/NHIS/2006/frmanual.pdf.
2. Dilley JA, Simmons KW, Boysun MJ, Pizacani BA, Stark MJ. Demonstrating the importance and feasibility of including sexual orientation in public health surveys: Health disparities in the Pacific Northwest. *Am J Public Health*. 2010;100(3):460-467. doi:10.2105/AJPH.2007.130336.
3. Sexual Minority Assessment Research Team (SMART). *Best Practices for asking questions about sexual orientation on surveys.*; 2009.
4. Centers for Disease Control and Prevention. Demographics Information – DMQ – SP NHANES 2013.
http://www.cdc.gov/nchs/data/nhanes/nhanes_13_14/DMQ_H.pdf. Published 2013.
5. Statistics Canada. Canadian Community Health Survey (CCHS) Annual Component - 2013 Questionnaire. http://www23.statcan.gc.ca/imdb-bmdi/instrument/3226_Q1_V10-eng.pdf. Published 2013.
6. Savin-Williams RC. A critique of research on sexual-minority youths. *J Adolesc*. 2001;24(1):5-13.
7. Sullivan MK. *Sexual minorities: Discrimination, challenges and development in America*. Routledge; 2013.
8. Poon C, Smith A, Saewyc EM, Society MC. *Sexual health of youth in BC*. Vancouver; 2015.
9. Serano J. *Whipping girl: A transsexual woman on sexism and the scapegoating of femininity*. Emeryville, CA: Seal; 2007.
10. Austin SB, Conron KJ, Patel A, Freedner N. Making sense of sexual orientation measures: Findings from a cognitive processing study with adolescents on health survey questions. *J LGBT Health Res*. 2007;3(1):55-65. doi:10.1300/J463v03n01.
11. Galupo MP, Mitchell RC, Gryniewicz AL, Davis KS, Gryniewicz AL. Sexual minority reflections on the Kinsey Scale and the Klein Sexual Orientation Grid: Conceptualization and Measurement. *J Bisex*. 2014;(June):00-00. doi:10.1080/15299716.2014.929553.
12. Friedman MS, Silvestre AJ, Gold MA, et al. Adolescents define sexual orientation and suggest ways to measure it. *J Adolesc*. 2004;27(3):303-317.

doi:10.1016/j.adolescence.2004.03.006.

13. Clark MA, Armstrong G, Bonacore L. Measuring sexual orientation and gender expression among middle-aged and older women in a cancer screening study. *J Cancer Educ.* 2005;20(2):108-112.
14. Miller K, Raynard N, Brody D. *Cognitive testing of the NHANES sexual orientation questions.*; 2001.
http://wwwn.cdc.gov/QBANK/report/Miller_NCHS_2001NHANESSexualityReport.pdf.
15. Miller K, Ryan JM. Design, development and Testing of the NHIS Sexual Identity Question. 2011:1-22.
16. Centers for Disease Control and Prevention, Services USD of H and H, National Center for Health Statistics. *A brief quality assessment of the NHIS sexual orientation data.*; 2014. <http://www.cdc.gov/nchs/data/nhis/qualityso2013508.pdf>.
17. Weinrich JD. On the design, development, and testing of sexual identity Questions: A discussion and analysis of Kristen Miller and J. Michael Ryan's work for the National Health Interview Survey. *J Bisex.* 2014;14(3-4):502-523. doi:10.1080/15299716.2014.952052.
18. Statistics Canada. General Social Survey Cycle 28 Victimization.
http://www23.statcan.gc.ca/imdb-bmdi/instrument/4504_Q1_V6-eng.htm.
Published 2014.
19. Savin-Williams RC. *The new gay teenager.* Cambridge, MA: Harvard University Press; 2005.
20. Laumann EO, Gagnon JH, Michael RT, Michaels S. *The social organization of sexuality: Sexual practices in the United States.* Chicago, IL: The University of Chicago Press; 1994.
21. Diamond LM. *Sexual fluidity understanding women's love and desire.* Cambridge, MA: Harvard University Press; 2008.
22. Bauer GR, Scheim A, Michellow W, Zou GY. Improving quantitative research methods in gender, sex, and population health: Theory, empirical evidence and development of applications for multi-dimensionality and intersectionality. 2013:1-33.
23. American Psychological Association (APA). Sexual orientation and homosexuality.
<https://web.archive.org/web/20130808032050/http://www.apa.org/helpcenter/sexual-orientation.aspx>. Published 2013.
24. Beaulieu--Prévost D, Fortin M. The measurement of sexual orientation: Historical

- background and current practices. *Sexologies*. 2015;24(1):e15-e19. doi:10.1016/j.sexol.2014.05.005.
25. Greenberg D. *The construction of homosexuality*. Chicago: The University of Chicago Press; 1988.
 26. Sell RL. Defining and measuring sexual orientation: a review. *Arch Sex Behav*. 1997;26(6):643-658. doi:10.1023/A:1024528427013.
 27. Katz N. *Gay American history: Lesbians and gay men in the United States*. Meridian, New York; 1992.
 28. Kinsey AC, Pomeroy WP, Martin CE. Sexual behaviour in the human male. *J Neuropathol Exp Neurol*. 1948;8(1).
 29. D'Emilio J. Sexual politics, sexual communities. In: University of Chicago Press; 2012.
 30. Klein F, Sepekoff B, Wolf TJ. Sexual orientation: A multi-variable dynamic process. *J Homosex*. 1985;11(1-2):35-49. doi:10.1300/J082v11n01_04.
 31. Korchmaros JD, Powell C, Stevens S. Chasing sexual orientation: a comparison of commonly used single-indicator measures of sexual orientation. *J Homosex*. 2013;60(4):596-614. doi:10.1080/00918369.2013.760324.
 32. Talley AE, Aranda F, Hughes TL, Everett B, Johnson TP. Longitudinal associations among discordant sexual orientation dimensions and hazardous drinking in a cohort of sexual minority women. *J Health Soc Behav*. 2015;56(2):225-245. doi:10.1177/0022146515582099.Longitudinal.
 33. Stroumsa D. The state of transgender health care: Policy, law, and medical frameworks. *Am J Public Health*. 2014;104(3):e31-e38.
 34. Bauer GR, Jairam JA, Baidoobonso SM. Sexual health, risk behaviors, and substance use in heterosexual-identified women with female sex partners: 2002 US National Survey of Family Growth. *Sex Transm Dis*. 2010;37(9):531-537. doi:10.1097/OLQ.0b013e3181d785f4.
 35. Ross LE, Steele L, Goldfinger C, Strike C. Perinatal depressive symptomatology among lesbian and bisexual women. *Arch Womens Ment Health*. 2007;10(2):53-59. doi:10.1007/s00737-007-0168-x.
 36. Igartua K, Thombs BD, Burgos G, Montoro R. Concordance and discrepancy in sexual identity, attraction, and behavior among adolescents. *J Adolesc Health*. 2009;45(6):602-608. doi:10.1016/j.jadohealth.2009.03.019.
 37. Savin-Williams RC. Who's gay ? Does it matter ? *Psychol Sci*. 2006;15(1):40-44.

38. Mustanski B, Birkett M, Greene GJ, Rosario M, Bostwick W, Everett BG. The association between sexual orientation identity and behavior across race/ethnicity, sex, and age in a probability sample of high school students. *Am J Public Health*. 2014;104(2):237-244. doi:10.2105/AJPH.2013.301451.
39. Saewyc EM, Bauer GR, Skay CL, et al. Measuring sexual orientation in adolescent health surveys: Evaluation of eight school-based surveys. *J Adolesc Health*. 2004;35(4):1-15. doi:10.1016/j.jadohealth.2004.06.002.
40. Vrangalova Z, Savin-Williams RC. Mostly heterosexual and mostly gay/lesbian: Evidence for new sexual orientation identities. *Arch Sex Behav*. 2012;41(1):85-101. doi:10.1007/s10508-012-9921-y.
41. Vrangalova Z, Savin-Williams RC. Psychological and physical health of mostly heterosexuals : A systematic review psychological and physical health of mostly heterosexuals : A Systematic Review. *J Sex Res*. 2014;51(4):410-455. doi:10.1080/00224499.2014.883589.
42. Savin-Williams RC, Vrangalova Z. Mostly heterosexual as a distinct sexual orientation group: A systematic review of the empirical evidence. *Dev Rev*. 2013;33(1):58-88. doi:10.1016/j.dr.2013.01.001.
43. Centers for Disease Control and Prevention. Sexual Behavior – (SXQ) Target Group: Female SPs 14-69 (Audio-CASI). http://www.cdc.gov/nchs/data/nhanes/nhanes_13_14/SXQ_ACASI_H.pdf. Published 2013.
44. Epstein R, McKinney P, Fox S, Garcia C. Support for a fluid-continuum model of sexual orientation: a large-scale Internet study. *J Homosex*. 2012;59(10):1356-1381. doi:10.1080/00918369.2012.724634.
45. Diamond LM. Female bisexuality from adolescence to adulthood: results from a 10-year longitudinal study. *Dev Psychol*. 2008;44(1):5-14. doi:10.1037/0012-1649.44.1.5.
46. Mock SE, Eibach RP. Stability and change in sexual orientation identity over a 10-year period in adulthood. *Arch Sex Behav*. 2012;41(3):641-648. doi:10.1007/s10508-011-9761-1.
47. Cass VM. Homosexual Identity Formation: A Theoretical Model. *J Homosex*. 1979;4:219-235.
48. Rosario M, Schrimshaw EW, Hunter J, Braun L. Sexual identity development among lesbian, gay, and bisexual youths: Consistency and change over time. *J Sex Res*. 2006;43(1):46-58. doi:10.1080/00224490609552298.
49. D'Augelli AR. Identity Development and Sexual Orientation: Toward a Model of Lesbian, Gay, and Bisexual Development. *Hum Divers Perspect People Context*.

1994:312-333.

50. Eliason MJ, Schope R. Shifting sands or solid foundation? Lesbian, gay, bisexual, and transgender identity formation. :3-27.
51. Everett BG. Sexual orientation disparities in sexually transmitted infections: Examining the intersection between sexual identity and sexual behavior. *Arch Sex Behav*. 2013;42(2):225-236. doi:10.1007/s10508-012-9902-1.
52. Millett GA, Peterson JL, Wolitski RJ, Stall R. Greater risk for HIV infection of black men who have sex with men: A critical literature review. *Am J Public Health*. 2006;96(6):1007-1019. doi:10.2105/AJPH.2005.066720.
53. D'Augelli AR, Hershberger SL, Pilkington NW. Lesbian, gay and bisexual youth and their families: Disclosure of sexual orientation and its consequences. *Am J Orthopsychiatry*. 1998;68(3).
54. Zhao Y, Montoro R, Igartua K, Thombs BD. Suicidal ideation and attempt among adolescents reporting “ unsure ” sexual same-sex attraction or behavior : *J Am Acad Child Adolesc Psychiatry*. 2010;49(2):104-113. doi:10.1016/j.jaac.2009.11.003.
55. Dempsey D, Hillier L, Harrison L. Gendered (s)explorations among same-sex attracted young people in Australia. *J Adolesc*. 2001;24(1):67-81. doi:10.1006/jado.2000.0363.
56. Brewster KL, Tillman KH. Sexual orientation and substance use among adolescents and young adults. *Am J Public Health*. 2012;102(6):1168-1176. doi:10.2105/AJPH.2011.300261.
57. Bauer GR, Jairam JA. Are lesbians really women who have sex with women (WSW)? Methodological concerns in measuring sexual orientation in health research. *Women Health*. 2008;48(4):383-408. doi:10.1080/03630240802575120.
58. Smith AMA, Rissel CE, Richters J, Grulich AE, De-Visser RO. Sex in Australia: sexual identity, sexual attraction and sexual experience among a representative sample of adults. *Aust N Z J Public Health*. 2003;27(2):138-145. doi:10.1111/j.1467-842X.2003.tb00801.x.
59. Bauer GR, Brennan DJ. The problem with “behavioral bisexuality”: Assessing sexual orientation in survey research. *J Bisex*. 2013;13(2):148-165. doi:10.1080/15299716.2013.782260.
60. Tjepkema M. Health care use among gay, lesbian and bisexual Canadians. *Health Reports*. 2008;1(82):53-64.
61. Gattis MN, Sacco P, Cunningham-Williams RM. Substance use and mental health disorders among heterosexual identified men and women who have same-sex

- partners or same-sex attraction: Results from the national epidemiological survey on alcohol and related conditions. *Arch Sex Behav*. 2012;41(5):1185-1197. doi:10.1007/s10508-012-9910-1.
62. Baumeister RF, Catanese KR, Vohs KDV. Is there a gender difference in strength of sex drive? Theoretical views, conceptual distinctions, and a review of relevant evidence. *Personal Soc Psychol Rev*. 2001;5(3):242-273.
 63. Bauer GR. Incorporating intersectionality theory into population health research methodology: Challenges and the potential to advance health equity. *Soc Sci Med*. 2014;110:10-17. doi:10.1016/j.socscimed.2014.03.022.
 64. Szymanski DM, Sung MR. Minority stress and psychological distress among Asian American sexual minority persons. *Couns Psychol*. 2010;38(6):848-872. doi:10.1177/0011000010366167.
 65. Lehavot K, Simoni JM. The impact of minority stress on mental health and substance use among sexual minority women. *J Consult Clin Psychol*. 2011;79(2):159-170. doi:10.1037/a0022839.
 66. Schrimshaw EW, Rosario M, Meyer-Bahlburg HFL, Scharf-Matlick AA. Test-retest reliability of self-reported sexual behavior, sexual orientation, and psychosexual milestones among gay, lesbian, and bisexual youths. *Arch Sex Behav*. 2006;35(2):225-234. doi:10.1007/s10508-005-9006-2.
 67. Pitts M, Rahman Q. Which behaviors constitute “having sex” among university students in the UK? *Arch Sex Behav*. 2001;30(2):169-176. doi:10.1023/A:1002777201416.
 68. Randall HE, Byers ES. What is sex? Students’ definitions of having sex, sexual partner, and unfaithful sexual behaviour. *Can J Hum Sex*. 2003;12(2):87-96. <http://search.proquest.com/docview/37874647?accountid=14700>.
 69. Byers ES, Henderson J, Hobson KM. University students’ definitions of sexual abstinence and having sex. *Arch Sex Behav*. 2009;38(5):665-674. doi:10.1007/s10508-007-9289-6.
 70. Katz-Wise SL, Reisner SL, Hughto JW, Keo-Meier CL. Differences in sexual orientation diversity and sexual fluidity in attractions among gender minority adults in Massachusetts. *J Sex Res*. 2015;(July):1-11. doi:10.1080/00224499.2014.1003028.
 71. Everett B. Sexual orientation, identity change and mental health: A longitudinal analysis. *J Health Soc Behav*. 2015;56(1):37-58. doi:10.1177/0022146514568349.
 72. Marshal MP, Friedman MS, Stall R, et al. Sexual orientation and adolescent substance use: A meta-analysis and methodological review. *Addiction*. 2008;103(4):546-556. doi:10.1111/j.1360-0443.2008.02149.x.

73. Wheldon CW, Kirby RS. Are there differing patterns of health care access and utilization Among male sexual minorities in the United States? *J Gay Lesbian Soc Serv.* 2013;25(1):24-36. doi:10.1080/10538720.2013.751886.
74. Wolitski RJ, Fenton KA. Sexual health, HIV and sexually transmitted infections among gay, bisexual and other men who have sex with men in the United States. *AIDS Behav.* 2011;15(SUPPL. 1):9-17. doi:10.1007/s10461-011-9901-6.
75. King M, Semlyen J, Tai SS, et al. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. *BMC Psychiatry.* 2008;8:70. doi:10.1186/1471-244X-8-70.
76. Lee JGL, Griffin GK, Melvin CL. Tobacco use among sexual minorities in the USA, 1987 to May 2007: a systematic review. *Tob Control.* 2009;18(4):275-282. doi:10.1136/tc.2008.028241.
77. The Fenway Institute. *Gathering Sexual Orientation Data on Statewide Behavioral Risk Factor Surveillance Surveys : A Call To Action for States.* Boston; 2014.
78. Veenstra G. Race, gender, class, and sexual orientation: intersecting axes of inequality and self-rated health in Canada. *Int J Equity Health.* 2011;10(1):3. doi:10.1186/1475-9276-10-3.
79. Brennan DJ, Ross LE, Dobinson C, Veldhuizen S, Steele LS. Men's sexual orientation and health in Canada. *Can J Public Health.* 2010;101(3):255-258.
80. Pakula B, Shoveller JA. Sexual orientation and self-reported mood disorder diagnosis among Canadian adults. *BMC Public Health.* 2013;13(209):1-7.
81. Steele LS, Ross LE, Dobinson C, Veldhuizen S, Tinmouth JM. Women's Sexual Orientation and Health: Results from a Canadian Population-Based Survey. *Women Health.* 2009;49(5):353-367. doi:10.1080/03630240903238685.
82. Remafedi G, Resnick M, Blum R, Harris L. Demography of Sexual Orientation in Adolescents. *Pediatrics.* 1992;89(4):714-721.
83. Reis E, Saewyc EM. *83,000 Youth: Selected Findings of Eight Population-Based Studies as They Pertain to Anti-Gay Harassment and the Safety and Well-Being of Sexual Minority Students.* Seattle; 1999.
84. Peters L, Murphy A, Tonkin R, Milner R, Cox D. *Adolescent Health Survey: Province of British Columbia.* Burnaby; 1993.
85. Statistics Canada. Canadian Community Health Survey (CCHS) Questionnaire for Cycle 2.1 January 2003 to November 2003 Revised version – July 2005. Statistics Canada. http://www23.statcan.gc.ca/imdb-bmdi/pub/instrument/3226_Q1_V2-eng.pdf. Published 2003.

86. Centers for Disease Control and Prevention. Sexual Behavior - SXQ. http://www.cdc.gov/nchs/data/nhanes/nhanes_01_02/ACASI_SXQ.pdf. Published 2001.
87. Hidaka Y, Operario D. Attempted suicide, psychological health and exposure to harassment among Japanese homosexual, bisexual or other men questioning their sexual orientation recruited via the internet. *J Epidemiol Community Health*. 2006;60(11):962-967. doi:10.1136/jech.2005.045336.
88. Teenwise Minnesota. *2014 Minnesota Adolescent Sexual Health Report*.; 2014.
89. Copen C, Chandra A, Febo-Vasquez I. *Sexual Behavior, Sexual Attraction, and Sexual Orientation Among Adults Aged 18–44 in the United States: Data From the 2011–2013 National Survey of Family Growth*.; 2016.
90. Beauchamp D. *Sexual Orientation and Victimization*.; 2004. http://www.mtroyal.ca/cs/groups/public/documents/pdf/psc_orientation_victimisation.pdf.
91. Statistics Canada. Canadian Community Health Survey - Annual Component (CCHS). <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226>. Published 2015.
92. Dillman, DA., Smyth, JD, & Christian LM. *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. John Wiley & Sons.; 2014.
93. Munro L, Travers R, St. John A, et al. A Bed of Roses?: Exploring the Experiences of LGBT Newcomer Youth Who Migrate to Toronto. *Ethn inequalities Health Soc care*. 2013;6(4):137-150.
94. Logie CH, James LL, Tharao W, Loutfy MR. “We don’t exist”: A qualitative study of marginalization experienced by HIV-positive lesbian, bisexual, queer and transgender women in Toronto, Canada. *J Int AIDS Soc*. 2012;15(2):1-11. doi:10.7448/IAS.15.2.17392.
95. Peters JW. The Decline and Fall of the “H” Word For Many Gays and Lesbians, the Term “Homosexual” is Flinch-Worthy. New York Times. http://www.nytimes.com/2014/03/23/fashion/gays-lesbians-the-term-homosexual.html?_r=0. Published 2014.
96. Fredriksen-Goldsen KI, Kim HJ. Count Me In: Response to Sexual Orientation Measures Among Older Adults. *Res Aging*. 2014:1-17. doi:10.1177/0164027514542109.
97. Jans M, Viana J, Grant D, Cochran SD, Lee AC, Ponce NA. Trends in Sexual Orientation Missing Data Over a Decade of the California Health Interview Survey. *Am J Public Health*. 2015;105(5):e1-e8. doi:10.2105/AJPH.2014.302514.

98. Ridolfo H, Miller K, Maitland A. Measuring sexual identity using survey questionnaires: How valid are our measures? *Sex Res Soc Policy*. 2012;9(2):113-124. doi:10.1007/s13178-011-0074-x.
99. Groves R, Fowler F. *Survey Methodology*. 2nd ed. Wiley; 2002.
100. Hottes T, Ferlatte O, Gilbert M. Misclassification and undersampling of sexual minorities in population surveys. *Am J Public Health*. 2015;105(1):2015. doi:10.2105/AJPH.2014.302408.
101. Kim HJ, Fredriksen-Goldsen KI. Nonresponse to a question on self-identified sexual orientation in a public health survey and its relationship to race and ethnicity. *Am J Public Health*. 2013;103(1):67-69. doi:10.2105/AJPH.2012.300835.
102. Eisenberg ML, Shindel AW, Smith JF, Lue TF, Walsh TJ. Who is the 40 Year-Old Virgin and Where Did He/She Come From? Data from the National Survey of Family Growth. *J Sex Med*. 2009;6(8):2154-2161.
103. Fredriksen-Goldsen KI, Muraco A. Aging and Sexual Orientation: A 25-Year Review of the Literature. *Res Aging*. 2010;32(3):372-413. doi:10.1177/0164027509360355.
104. Heath H. The gift of understanding: Behind closed doors. [References]. *J Older People Nurs*. 2006;1(4):250-251. doi:http://dx.doi.org/10.1111/j.1748-3743.2006.00040.x.
105. Phelan S. *Sexual Strangers: Gays, Lesbians, and Dilemmas of Citizenship*. Temple University Press; 2010.
106. Lubbe C. LGBT Parents and Their Children: Non-Western Research and Perspectives. In: Goldberg AE, Allen KR, eds. *LGBT-Parent Families*. Springer US; 2013:209-224.
107. Shirpak KR, Maticka-Tyndale E, Chinichian M. Iranian Immigrants' perceptions of sexuality in Canada: A symbolic interactionist approach. *Can J Hum Sex*. 2007;16(3-4):113-128. http://www.scopus.com/inward/record.url?eid=2-s2.0-39749184079&partnerID=tZOtx3y1.
108. Wong JP-H, Poon MK-L. Challenging homophobia and heterosexism through storytelling and critical dialogue among Hong Kong Chinese immigrant parents in Toronto. *Cult Health Sex*. 2013;15(1):15-28. doi:10.1080/13691058.2012.738310.
109. Nakamura N, Chan E, Fischer B. "Hard to crack": experiences of community integration among first- and second-generation Asian MSM in Canada. *Cultur Divers Ethnic Minor Psychol*. 2013;19(3):248-256. doi:10.1037/a0032943.
110. Rosario M, Schrimshaw EW, Hunter J. Ethnic/racial differences in the coming-out

- process of lesbian, gay, and bisexual youths: a comparison of sexual identity development over time. *Cultur Divers Ethnic Minor Psychol.* 2004;10(3):215-228. doi:10.1037/1099-9809.10.3.215.
111. Finlay B, Walther CS. The relation of religious affiliation, service attendance and other factors to homophobic attitudes among university students. *Rev Relig Res.* 2003;44(4):370-393.
 112. Wilkinson L, Pearson J. High School Religious Context and Reports of Same-Sex Attraction and Sexual Identity in Young Adulthood. *Soc Psychol Q.* 2013;76(2):180-202. doi:10.1177/0190272513475458.
 113. Lipka M. Young U.S. Catholics overwhelmingly accepting of homosexuality. Fact Tank.
 114. Hooghe M, Meeusen C. Homophobia and the Transition to Adulthood: A Three Year Panel Study among Belgian Late Adolescents and Young Adults, 2008-2011. *J Youth Adolesc.* 2012;41(9):1197-1207. doi:10.1007/s10964-012-9786-3.
 115. Nurish A. Women's Same-sex Relations in Indonesian Pesantren. *Gend Technol Dev.* 2010;14(2):267-277. doi:10.1177/097185241001400207.
 116. Boellstorff T. *The Gay Archipelago: Sexuality and Nation in Indonesia.* 1st ed. Princeton University Press; 2005.
 117. Cinnirella M, Jaspal R. Identity processes, threat and interpersonal relations: accounts from British Muslim gay men. 2012:215-240. doi:10.1080/00918369.2012.638551.
 118. Mercer CH, Tanton C, Prah P, Erens B, Sonnenberg P, Clifton S, Macdowall W, Lewis R, Field N, Datta J. AJC. Changes in sexual attitudes and lifestyles in Britain through the life course and over time: findings from the National Surveys of Sexual Attitudes and Lifestyles (Natsal). *Lancet.* 2013;382(9907):1781-1794. doi:10.1016/S0140.
 119. Chandra A, Mosher WD, Copen C, Sionean C. *Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data from the 2006-2008 National Survey of Family Growth.* Vol 19.; 2011. doi:10.1007/978-94-007-5512-3.
 120. Kenamer DJ, Honnolond J, Bradford J, Hendricks M. Differences in disclosure of sexuality among African American and white gay / bisexual men : Implications for HIV/AIDS Prevention. *AIDS Educ Prev.* 2000;12(6):519-531.
 121. Kuper LE, Nussbaum R, Mustanski B. Exploring the Diversity of Gender and Sexual Orientation Identities in an Online Sample of Transgender Individuals. *J Sex Res.* 2012;49(2-3):244-254. doi:10.1080/00224499.2011.596954.
 122. Better A, Simula BL. How and for whom does gender matter ? Rethinking the

- concept of sexual orientation. *Sexualities*. 2015;18(5/6):665-680.
doi:10.1177/1363460714561716.
123. Bauer GR, Hammond R, Travers R, Kaay M, Hohenadel KM, Boyce M. ““ I Don’t Think This Is Theoretical ; This Is Our Lives””: How Erasure Impacts Health Care for Transgender People. *J Assoc Nurses AIDS Care*. 2009;20(5):348-361.
doi:10.1016/j.jana.2009.07.004.
 124. Bauer GR. *Making Sure Everyone Counts: Considerations for Inclusion, Identification, and Analysis of Transgender and Transsexual Participants in Health Surveys*. In: *CIHR Institute of Gender and Health*. Vancouver; 2012.
 125. Brumbaugh SM, Sanchez LA, Nock SL, Wright JD. Attitudes toward gay marriage in states undergoing marriage law transformation. *J Marriage Fam*. 2008;70(2):345-359.
 126. LaMar L, Kite M. Sex differences in attitudes toward gay men and lesbians: A multidimensional perspective. *J Sex Res*. 1998;35(2):189-196.
 127. Facebook. Facebook Ad Basics.
<https://www.facebook.com/business/learn/facebook-ads-basics/>. Published 2015.
 128. Hernandez-Romieu AC, Sullivan PS, Sanchez TH, et al. The Comparability of Men Who Have Sex With Men Recruited From Venue-Time- Space Sampling and Facebook: A Cohort Study. *JMIR Res Protoc*. 2014;3(3).
 129. Bhutta CB. Not by the Book: Facebook as a Sampling Frame. *Sociol Methods Res*. 2012;41(1).
 130. Canadian Partnership for Tomorrow Project Questionnaire Team. *Ontario Health Study— Baseline Questionnaire*.; 2010.
 131. Tate CC, Ledbetter JN, Youssef CP. A Two-Question Method for Assessing Gender Categories in the Social and Medical Sciences. *J Sex Res*. 2012;(June 2015):1-10. doi:10.1080/00224499.2012.690110.
 132. Teddlie C, Yu F. Mixed Methods Sampling A Typology With Examples. *J Mix Methods Res*. 2007;1(1):77-100.
 133. Willis GB. Cognitive Interviewing. A “how to” guide. *Evaluation*. 1999:1-37.
doi:10.1525/jer.2006.1.1.9.
 134. Reisner SL, Conron KJ, Tardiff LA, Jarvi S, Gordon AR, Austin SB. Monitoring the health of gender minority populations: Cognitive testing of natal sex and gender identity survey items in a U.S. national cohort of emerging adults. 2014;14(1):1-10. doi:10.1186/1471-2458-14-1224.
 135. United Nations. Definition of Youth.

<http://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-definition.pdf>.
Published 2011.

136. Bauer GR, Scheim AI, Pyne J, Travers R, Hammond R. Intervenable factors associated with suicide risk in transgender persons : a respondent driven sampling study in Ontario , Canada. *BMC Public Health*. 2015;15(525).
doi:10.1186/s12889-015-1867-2.
137. Statistics Canada. *Canadian Community Health Survey (CCHS) Annual Component, 2009 - 2010 Derived Variable (DV) Specifications*. Ottawa, ION; 2010. http://www23.statcan.gc.ca/imdb-bmdi/pub/document/3226_D71_T9_V1-eng.pdf.
138. Busseri MA, Willoughby T, Chalmers H, Bogaert AF. On the Association Between Sexual Attraction and Adolescent Risk Behavior Involvement : Examining Mediation and Moderation. *Dev Psychol*. 2008;44(1):69-80.
doi:10.1037/0012-1649.44.1.69.
139. Busseri MA, Willoughby T, Chalmers H, Bogaert AR. Same-sex attraction and successful adolescent development. *J Youth Adolesc*. 2006:563-575.
doi:10.1007/s10964-006-9071-4.
140. Fergusson DM, Horwood LJ, Beautrais AL. Is Sexual Orientation Related to Mental Health Problems and Suicidality in Young People? *Arch Gen Psychiatry*. 1999;56(10).
141. Willis GB, Lessler JT. Question Appraisal System. *System*. 1999.
142. Kerfeld CI, Dudgeon BJ, Engel JM, Kartin D. Development of Items that Assess Physical Function in Children who Use Wheelchairs. *Pediatr Phys Ther*. 2013;25(2):158-166. doi:10.1016/j.biotechadv.2011.08.021.Secreted.
143. George M, Pinilla R, Abboud S, Shea JA, Rand C. Innovative use of a standardized debriefing guide to assist in the development of a research questionnaire with low literacy demands. *Appl Nurs Res*. 2013;26(3):139-142.
doi:10.1016/j.apnr.2012.11.005.
144. Akobeng AK. Understanding diagnostic tests 1: sensitivity, specificity and predictive values. *Acta Paediatr*. 2007;96(3):338-341.
145. Viera AJ, Garrett JM. Understanding interobserver agreement: the kappa statistic. *Fam Med*. 2005;37(5):360-363.
146. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33(1):159-174.
147. Creswell JW, Plano Clark VL. *Designing and Conducting Mixed Methods Research*. Thousand Oaks, London: Sage Publication; 2002.

148. Ivankova N, Creswell J, Stick SL. Using Mixed-Methods Sequential Explanatory Design : From Theory to Practice. *Field methods*. 2006;18(1):3-20. doi:10.1177/1525822X05282260.
149. Bauer GR, Travers R, Scanlon K, Coleman TA. High heterogeneity of HIV-related sexual risk among transgender people in Ontario , Canada : a province-wide respondent-driven sampling survey. *BMC Public Health*. 2012;12(292):1-12. doi:10.1186/1471-2458-12-292.
150. Russell ST, Clarke TJ, Clary J. Are Teens ““ Post-Gay ””? Contemporary Adolescents ’ Sexual Identity Labels. *J Youth Adolescence*. 2009;(38):884-890. doi:10.1007/s10964-008-9388-2.
151. Halloran L. Survey Shows Striking Increase in Americans Who Know and Support Transgender People. Human Rights Campaign. <http://www.hrc.org/blog/survey-shows-striking-increase-in-americans-who-know-and-support-transgende>. Published 2015.
152. Carlson KB. The true north LGBT: New poll reveals landscape of gay Canada. National Post. <http://news.nationalpost.com/news/canada/the-true-north-lgbt-new-poll-reveals-landscape-of-gay-canada>. Published 2012.
153. Statistics Canada. Education in Canada: Attainment, Field of Study and Location of Study. Statistics Canada. <https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-012-x/99-012-x2011001-eng.cfm>. Published 2015.
154. Macleod MA, Bauer GR, Robinson M, et al. Biphobia and Anxiety Among Bisexuals in Ontario , Canada Biphobia and Anxiety Among Bisexuals in Ontario , Canada. 2015;19:217-243. doi:10.1080/19359705.2014.1003121.
155. Statistics Canada. Same-sex couples and sexual orientation... by the numbers. 2015. http://www.statcan.gc.ca/eng/dai/smr08/2015/smr08_203_2015.
156. Statistics Canada. Canadian Community Health Survey (CCHS) - 2015. http://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&lang=en&Item_Id=238890. Published 2016.
157. Smalley KB, Warren JC, Barefoot KN. Differences in Health Risk Behaviors Across Understudied LGBT Subgroups. *Health Psychol*. 2016;35(2):103-114.
158. Bates B, Gotwalt A, Holden EW, et al. *STD Communications Database - Interviews with Non-Gay Identified Men Who Have Sex with Men.*; 2005.

Appendices

Appendix A: Recruitment Strategies

**Are you living in Canada right now?
And are you at least 14 years of age?**

If so, help us evaluate survey questions asked in health research about demographics (who people are):

There are three ways to participate:

1. Complete an online survey (less than 5 mins) at:
<http://northernoriole.ca/improvinghealthresearch>
2. If you provide your email in step 1, you may be emailed about participating in a follow-up survey (less than 5 minutes)
3. In addition to responding to some follow-up survey questions, if you provide your email in step 1, you may be asked to do a interview (30-60 minutes). **Interview participants will be reimbursed for their time with a \$50 gift card.**

Want to know more about this study?

Contact [REDACTED]



Appendix B: Email Invitation to Participants

E-mail #1: For participants who will be invited to complete the brief follow-up survey:

SUBJECT: Brief Follow Up Survey – Improving Health Research

Dear (Participant Name or Initials),

We hope this message find you well. Approximately one week ago, you completed our short survey titled “Improving Health Research on Canadians” on demographics questions used in health research. Thank you for your participation.

You are receiving this email because you had previously agreed that you would be willing to complete a few more follow-up questions for our study. These questions should take about **5 minutes** to complete. You can access them through the link below:

<http://northernoriole.ca/improvinghealthresearch/followup.php>

You will have **two weeks** from today’s date to complete the survey questions. After that you will not be able to log in. When you go to the link above, you will need to enter the following randomly-generated username and password to access the correct questions for you:

username: (include here)

password: (include here)

You received information on this survey when you completed the first survey questions. We would like to remind you that participation in this brief follow-up is voluntary, and your responses are confidential. We appreciate your time in considering our request. Your participation may help us to improve the questions used to identify the characteristics of residents of Canada in health research.

Many thanks,

(Name of PI)

E-mail #2: For participants who will be invited to schedule a time to complete the survey questions and then an interview:

(One week after completion of first survey)

Dear (Participant Name or Initials),

We hope this message find you well. Approximately one week ago, you completed our short survey titled “Improving Health Research on Canadians” on demographics questions used in health research. Thank you for your participation.

You are receiving this e-mail because you had previously agreed that you would be willing to complete a few more follow-up questions for our study (**this would take approximately 5 minutes**). In addition, by providing your email you have indicated that you are interested in doing an interview with us about what you think of these survey questions (**this would take approximately 30-60 minutes plus a \$50 gift card as a compensation for your time**). The interview will be audio recorded, which is required for the completion of the interview.

If you are not interested in an interview (or do not want to be audio-recorded), but would still like to do the short follow-up survey, reply to this e-mail and we will happily send you login information so you can do that.

Should you agree to participate in a follow-up interview, we can conduct that by phone or Skype at a time of your choosing. We ask that you make sure you have privacy during this time, as we cannot interview you in front of others (other than infants and very small children). If you are interested in being interviewed, please click on the link below to schedule an interview with our study staff. Please select a time and date between: **(INSERT DATES)**. Once you have entered your name and requested a date and time, you will need to **scroll all the way to the right hand side of the page to save your selections**.

<http://doodle.com/poll/27hr5afqk3f3f4vq>

If none of the times listed works for you, please reply to this e-mail with 2 or 3 alternative times that will work best for you in the next 2 weeks, and we will do everything possible to make those times work.

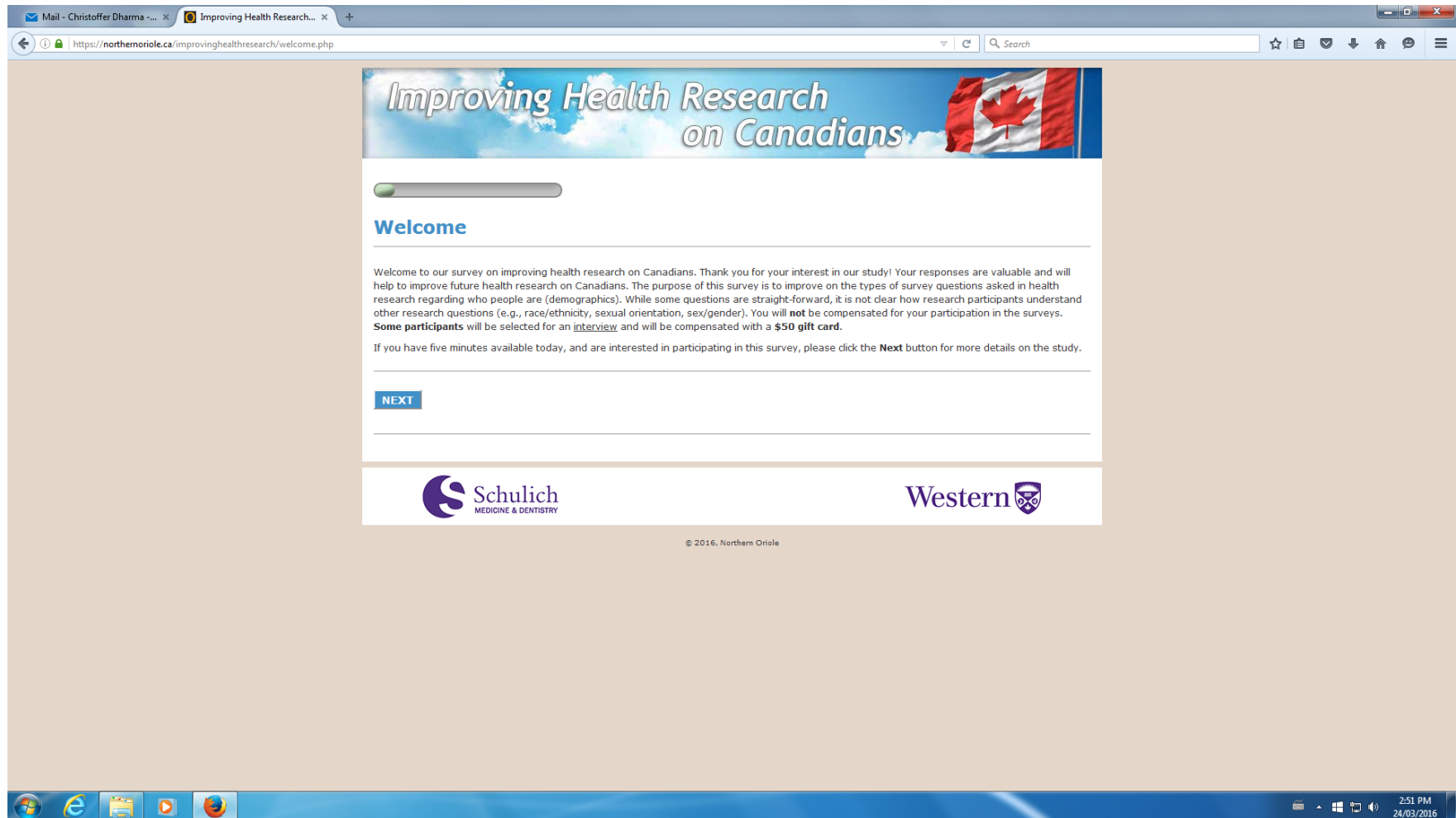
If you decide to book an interview time with us, we will confirm your appointment by e-mail, let you know who will be interviewing you, and will send you our phone number (toll-free) and Skype address.

You received information on the follow-up survey and interview when you completed the first survey questions a week ago. We would like to remind you that participation in this brief follow-up is voluntary, as is the interview, and your responses are confidential (other than if child protection concerns are raised). We appreciate your time in considering our request. Your participation may help us to improve the questions used to identify the characteristics of residents of Canada in health research.

Many thanks,

(Name of PI)

Appendix C: Sample Screenshots of Survey



Mail - Christoffer Dharma - ... x Improving Health Research... x print screen windows - Go... x +

https://northernoriole.ca/improvinghealthresearch/letterofinformation.php

print screen windows

11. Confidentiality

All survey data collected will remain confidential. If the results are published, your name will not be used. Contact information that you provide for follow-up (your first name or initials and e-mail address) will not be stored together with other information you provide about yourself.

If you are selected to participate in an interview and agree to participate, your interview will be audio-recorded and typed up into a written document. All identifiers (e.g., names, very specific details such as employers) will be removed from the document. All data will be stored in secure databases. Data will be kept confidential, unless disclosure is legally required in cases where information provided indicates a child is in need of protection.

Representatives of The University of Western Ontario Non-Medical Research Ethics Board may require access to your study-related records to monitor the conduct of the research.

12. Contacts for Further Information

If you require any further information regarding this research project or your participation in the study you may contact:

Dr. Greta Bauer, Principal Investigator
greta.bauer@schulich.uwo.ca
519-661-2111 ext. 86262

Dr. Jessica Braimoh, Project Coordinator
Jessica.Braimoh@schulich.uwo.ca
519-661-2111 ext. 86260

improvinghealthresearch@schulich.uwo.ca

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Research Ethics (519) 661-3036, email: ethics@uwo.ca.

13. Publication


If the results of the study are published, your name will not be used. If you would like to receive a copy of the study results, you may e-mail Dr. Greta Bauer at greta.bauer@schulich.uwo.ca. Study results will also be available through Dr. Bauer's website at www.epidemiologeeek.ca, to be launched in 2016.


14. Consent

You indicate your voluntary agreement to participate by responding to the questions.

Please print a copy of this letter for future reference.

CONSENT

 Schulich
MEDICINE & DENTISTRY

 Western

© 2016, Northern Oriole


2:54 PM
24/03/2016

Improving Health Research... x +

https://northernoriole.ca/improvinghealthresearch/part8.php

Search

Improving Health Research on Canadians




Survey


Do you consider yourself to be ... ?

- ☐ ... heterosexual (sexual relations with people of the opposite sex)
- ☐ ... homosexual, that is lesbian or gay (sexual relations with people of your own sex)
- ☐ ... bisexual (sexual relations with people of both sexes)
- ☐ Don't know

☐ Ready to submit this screen.

[NEXT](#)

 Schulich
MEDICINE & DENTISTRY

 Western

© 2016, Northern Oriole

2:52 PM
01/04/2016

Improving Health Research... x Mail - Christoffer Dharma - ... x +

https://northemoriole.ca/improvinghealthresearch/part9.php

Search

Improving Health Research on Canadians

Survey

Do you consider yourself to be?

- ☐ Heterosexual or straight;
- ☐ Gay or lesbian; or
- ☐ Bisexual
- ☐ Don't know

In your lifetime, who have you had sex with?

- ☐ Men only,
- ☐ Women only,
- ☐ Both men and women,
- ☐ I have not had sex

In the past 12 months, who have you had sex with?


- ☐ Men only,
- ☐ Women only,
- ☐ Both men and women,
- ☐ I have not had sex


People are different in their sexual attraction to other people. Which best describes your feelings? Are you ... ?

- ☐ Only attracted to females
- ☐ Mostly attracted to females
- ☐ Equally attracted to females and males
- ☐ Mostly attracted to males
- ☐ Only attracted to males
- ☐ Not sure

☐ Ready to submit this screen.

NEXT

 Schulich
MEDICINE & DENTISTRY

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2:58 PM
01/04/201

Mail - Christoffer Dharma x Improving Health Research... x

https://northernorole.ca/improvinghealthresearch/contactjb.php

Search

Improving Health Research on Canadians

Contact

Thank you for helping test out survey questions! We would like to e-mail you in one week and ask you to test out different versions of three of these questions in a follow-up survey. This would take approximately 5 minutes of your time. A small group of participants will also be invited to have individual telephone or Skype interviews to discuss their answers. If you provide your first name or initials and e-mail address below, this will allow us to e-mail you with an invitation to participate in one of these options. Any information entered below will be stored separately (in a separate database) from the other information you provided today.

May we contact you?

☐ Yes


First name or initials:


Email address:

☐ No

☐ Ready to submit this screen.

[NEXT](#)

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1:30 PM 08/04/2016

Appendix D: Letter of Information

1. Invitation to Participate

You are invited to participate in this study because you received information via-e-mail or chose to click on an online link.

2. Purpose of the Letter

The purpose of this letter is to provide you with information required for you to make an informed decision regarding participation in this research.

3. Purpose of this Study

The purpose of this study is to improve the types of survey questions asked in health research regarding who people are (demographics). While some are straightforward, it is not clear how research participants understand other research questions (e.g. race/ethnicity, sexual orientation, sex/gender).

4. Inclusion Criteria

Individuals who live in Canada and are age 14 and over are eligible to participate in this study.

5. Exclusion Criteria

Individuals who do not live in Canada, or are under age 14 are not eligible to participate in this study.

6. Study Procedures

If you agree to participate, you will be asked to answer a few survey questions about who you are (demographics). One week later, you will then be contacted via e-mail to complete a few additional survey questions. You will have two weeks to complete this second brief survey.. At the time of e-mail contact, a few participants (90 total) will be contacted for telephone or video interviews regarding these questions and how they can be improved. We will select these 90 participants to have a broad cross-section of Canadians based on information they have shared about themselves in the survey. Participation is completely online, or in the case of an interview it may also be over the telephone. It is anticipated that the initial survey will take 10 minutes, and the follow-up survey 5 minutes. For those selected and who agree to participate and be audio-recorded, we expect interviews to take 30-60 minutes. Interviews will be audio-recorded and then typed up into transcripts, with identifying information (for example, any names or places of employment) removed.

7. Possible Risks and Harms

There are no known or anticipated risks associated with participating in this study, though it is possible you may be uncomfortable with some of the questions. You are welcome to skip any questions you do not wish to answer.

8. Possible Benefits

You may not directly benefit from participating in this study but information gathered may provide benefits to society as a whole which include better health research that more correctly identifies characteristics of residents of Canada.

9. Compensation

You will not be compensated for your participation in the surveys. Interview participants will be compensated with a \$50 gift card, regardless of whether they complete the interview.

10. Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time.

11. Confidentiality

All survey data collected will remain confidential. If the results are published, your name will not be used. Contact information that you provide for follow-up (your first name or initials and e-mail address) will not be stored together with other information you provide about yourself.

If you are selected to participate in an interview and agree to participate, your interview will be audio-recorded and typed up into a written document. All identifiers (e.g., names, very specific details such as employers) will be removed from the document. All data will be stored in secure databases. Data will be kept confidential, unless disclosure is legally required in cases where information provided indicates a child is in need of protection.

Representatives of The University of Western Ontario Non-Medical Research Ethics Board may require access to your study-related records to monitor the conduct of the research.

12. Contacts for Further Information

If you require any further information regarding this research project or your participation in the study you may contact:

(Name), Principal Investigator

(Email)

(Telephone number)

(Name), Project Coordinator

(Email)

(Telephone number)

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Research Ethics (Telephone number), email: (email).

13. Publication

If the results of the study are published, your name will not be used. If you would like to receive a copy of the study results, you may e-mail (Name) at (Email). Study results will also be available through (Name)'s website at www.epidemiologeeek.ca, to be launched in 2016.

14. Consent

You indicate your voluntary agreement to participate by responding to the questions.

Appendix E: Codebook of Survey Questions

What is your age? _____ years Q1 Are you 14 years of age or over? Yes/No Q1_conf

What are the first two digits of your postal code? ____ Q2
(logic > Yes/No Q2_valid) Do you live in Canada? Yes/No Q2_conf

Participants will randomly answer one of the following questions or sets of questions regarding sex, gender and transgender. The others will be completed on follow-up one to three weeks later:

Set A:

Are you ... ? Q3

- 1 ☐ Male
- 2 ☐ Female
- 3 ☐ Something else (*please specify*) ____ Q3_3 ____

Do you consider yourself to be trans (transgender, transsexual, or a person with a history of transitioning sex)? Q4

- 1 ☐ Yes
- 2 ☐ No
- 3 ☐ Don't know

Following questions are for those who answered “Yes” or “Don't know”:

What was your assigned sex at birth? Q5

- 1 ☐ Male
- 2 ☐ Female
- 3 ☐ Undetermined

What is your felt gender? Q6

- 1 ☐ Male or primarily masculine
- 2 ☐ Female or primarily feminine
- 3 ☐ Both male and female
- 4 ☐ Neither male nor female
- 5 ☐ Don't know

What gender do you currently live as in your day-to-day life? Q7

- 1 ☐ Male
- 2 ☐ Female
- 3 ☐ Sometimes male, sometimes female

4 ☐ Third gender, or something other than male or female

Have you undertaken any of the following to medically transition sex? (Check all that apply)

- ☐ Hormone therapy **Q8_1**
- ☐ Hair removal (electrolysis or laser) **Q8_2**
- ☐ Mastectomy or chest reconstruction (an operating to remove breasts or construct a male chest) **Q8_3**
- ☐ Breast augmentation (an operating to make breasts larger using implants) **Q8_4**
- ☐ Hysterectomy (an operation to remove the uterus) **Q8_5**
- ☐ Oophorectomy (an operation to remove the ovaries) **Q8_6**
- ☐ Metoidioplasty (an operation to free the clitoris) **Q8_7**
- ☐ Phalloplasty (an operation to construct a penis) **Q8_8**
- ☐ Orchiectomy (an operation to remove the testicles) **Q8_9**
- ☐ Vaginoplasty (an operation to construct a vagina) **Q8_10**
- ☐ None of the above **Q8_11**

Set B:

What is your current gender identity? Q9

- 1 ☐ Male
- 2 ☐ Female
- 3 ☐ Trans male/Trans man
- 4 ☐ Trans female/Trans woman
- 5 ☐ Genderqueer/Gender non-conforming
- 6 ☐ Different identity (please specify): **Q9_6**

What sex were you assigned at birth, meaning on your original birth certificate? Q10

- 1 ☐ Male
- 2 ☐ Female

Do you personally know at least one person who is transgender? Q11

- 1 ☐ Yes
- 2 ☐ No

What is the highest level of education that you have attained? Q12

- 1 ☐ Earned doctorate (Ph.D., D.Sc., D.Ed.)
- 2 ☐ Master's degree (M.A., M.Sc., M.Ed)
- 3 ☐ Degree in Medicine, Dentistry, Veterinary Medicine or Optometry (M.D., D.D.S., D.M.D., O.D.)
- 4 ☐ Bachelor's or undergraduate university degree or teacher's college (B.A., B.Sc., LL.B, B.Ed.)

- ☐ 5 Diploma or certificate from community college, CEGEP or nursing school
☐ 6 Diploma or certificate from trade, technical or vocational school or business college
☐ 7 Some university
☐ 8 Some community college, CEGEP or nursing school
☐ 9 Some trade, technical or vocational school, or business college
☐ 10 High school diploma
☐ 11 Some high school
☐ 12 Elementary school
☐ 13 No schooling
☐ 14 Other – Specify (please specify) _____ **Q12_14** _____
☐ 15 Don't know

What is the highest level of education attained by one of your parents? Q13

- ☐ 1 Earned doctorate (Ph.D., D.Sc., D.Ed.)
☐ 2 Master's degree (M.A., M.Sc., M.Ed.)
☐ 3 Degree in Medicine, Dentistry, Veterinary Medicine or Optometry (M.D., D.D.S., D.M.D., O.D.)
☐ 4 Bachelor's or undergraduate university degree or teacher's college (B.A., B.Sc., LL.B, B.Ed.)
☐ 5 Diploma or certificate from community college, CEGEP or nursing school
☐ 6 Diploma or certificate from trade, technical or vocational school or business college
☐ 7 Some university
☐ 8 Some community college, CEGEP or nursing school
☐ 9 Some trade, technical or vocational school, or business college
☐ 10 High school diploma
☐ 11 Some high school
☐ 12 Elementary school
☐ 13 No schooling
☐ 14 Other – Specify (please specify) _____ **Q13_14** _____
☐ 15 Don't know

Are you a religious person? Q14

- ☐ 1 Yes
☐ 2 Somewhat
☐ 3 No

Are you ... ? Q15

- ☐ 1 Christian – Catholic
☐ 2 Christian – non-Catholic
☐ 3 Muslim
☐ 4 Jewish
☐ 5 Sikh
☐ 6 Hindu
☐ 7 Buddhist
☐ 8 Neo-pagan
☐ 9 Agnostic
☐ 10 Atheist
☐ 11 Something else _____ **Q15_11** _____

Are you ... ? Q16

- 1 ☐ First Nations (Status or non-status)
 2 ☐ Métis
 3 ☐ Inuk (Inuit)
 4 ☐ None of the above
 5 ☐ Don't know

Do you personally know at least one person who is First Nations, Métis, or Inuit? Q17

- 1 ☐ Yes
 2 ☐ No

**You may belong to one or more racial or cultural groups on the following list. Are you ... ?
 (Check up to 6 responses)**

- ☐ White **Q18_1**
☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.) **Q18_2**
☐ Chinese **Q18_3**
☐ Black **Q18_4**
☐ Filipino **Q18_5**
☐ Latin American **Q18_6**
☐ Arab **Q18_7**
☐ Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.) **Q18_8**
☐ West Asian (e.g., Iranian, Afghan, etc.) **Q18_9**
☐ Korean **Q18_10**
☐ Japanese **Q18_11**
☐ Another group (please specify) _____ **Q18_12_1** _____
Q18_12_2
☐ Don't know **Q18_13**

Participants will randomly answer one of the following questions regarding racialization:

Question A:**Are you perceived or treated as a person of colour? Q19**

- 1 ☐ Yes
 2 ☐ No

Question B:**Are you a member of a visible minority group? Q20**

- 1 ☐ Yes
 2 ☐ No

Participants will randomly answer one of the following questions or sets of questions regarding sexual orientation:

Set A:

Do you consider yourself to be ... ? Q21

- 1 ☐ ... heterosexual (sexual relations with people of the opposite sex)
- 2 ☐ ... homosexual, that is lesbian or gay (sexual relations with people of your own sex)
- 3 ☐ ... bisexual (sexual relations with people of both sexes)
- 4 ☐ Don't know

Set B:

Do you consider yourself to be: Q22

- 1 ☐ Heterosexual or straight;
- 2 ☐ Gay or lesbian; or
- 3 ☐ Bisexual?
- 4 ☐ Don't know

In your lifetime, who have you had sex with? Q23

- 1 ☐ Men only,
- 2 ☐ Women only,
- 3 ☐ Both men and women,
- 4 ☐ I have not had sex

In the past 12 months, who have you had sex with? Q24

- 1 ☐ Men only,
- 2 ☐ Women only,
- 3 ☐ Both men and women,
- 4 ☐ I have not had sex

People are different in their sexual attraction to other people. Which best describes your feelings? Are you ...? Q25

- 1 ☐ Only attracted to females
- 2 ☐ Mostly attracted to females
- 3 ☐ Equally attracted to females and males
- 4 ☐ Mostly attracted to males
- 5 ☐ Only attracted to males
- 6 ☐ Not sure

Do you personally know at least one person who is bisexual, gay, or lesbian? Q26

- 1 ☐ Yes
2 ☐ No

What is your personal history with regard to immigration to Canada? Q27

- 1 ☐ Born Canadian
2 ☐ Immigrated to Canada from _____ **Q27_2** _____
3 ☐ In Canada temporarily from _____ **Q27_3** _____

Following question is for those who immigrated or are in Canada temporarily:

At what age did you first come to Canada? _____ years Q28

What is your family history with regard to immigration to Canada? (Check as many as apply)

- ☐ Parent(s) born Canadian **Q29_1**
☐ Parent(s) immigrated to Canada from _ **Q29_2a** _ and _ **Q29_2b** _ **Q29_2**
☐ Parent(s) remained in home country **Q29_3**
☐ I was adopted by Canadian parents **Q29_4**
☐ Don't know **Q29_5**

What was your first language? Q30

- 1 ☐ English
2 ☐ French
3 ☐ Another language: _____ **Q30_3** _____

Following question is for those who answered other than "English" above:

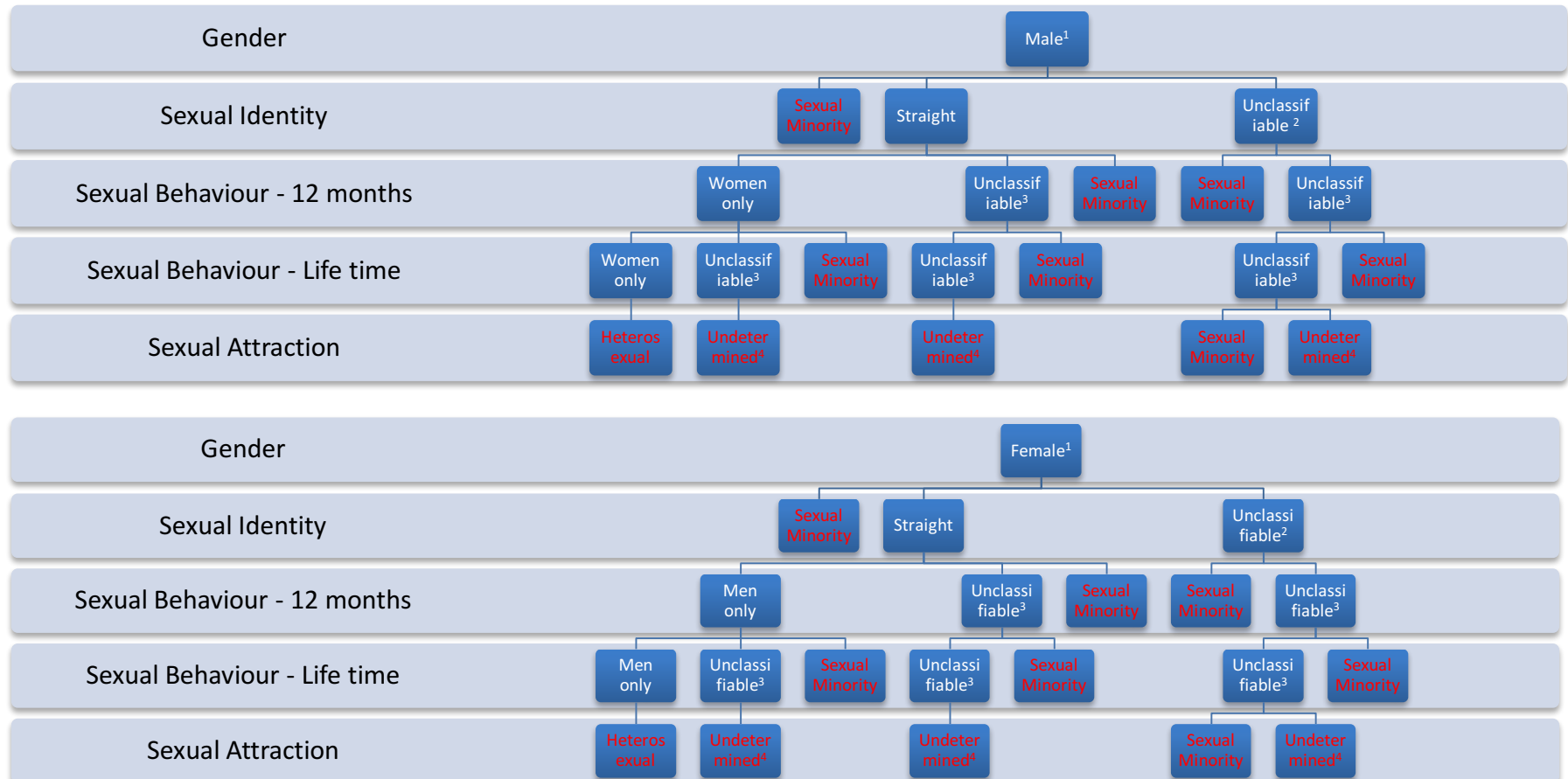
At what age did you begin using English on a regular basis? _____ years Q31

Thank you for helping test out survey questions! In one to three weeks, we would like you to test out different versions of three of these questions in a follow-up survey. This would take approximately 3 minutes of your time. A small group of participants will also be invited to have individual telephone or Skype interviews to discuss their answers. We would like to e-mail you in a week with an invitation to participate in one of these options. If you provide your first name or initials and e-mail address below, it will be stored separately from the information you provided today.

May we contact you? MayWeContactYou

YesYes. First name or initials: _____ **FirstnameOrInitials** _____ e-mail address: _____ **Email** _____
NoNo.

Appendix F: Flowchart of Assigning Sexual Minorities Based on SMART Guide Questions



1. Those who identified as "something else" were classified as sexual minority.

2. Unclassifiable identities include "don't know" or skipped

3. Unclassifiable behaviours include "I have not had sex" or skipped

4. Unclassifiable attraction include "not sure". Undetermined occurs when one cannot be assigned a minority status or not heterosexual on all 4 measures

Appendix G: Interview Guide

1. How did you decide to answer these questions?
<p><i>Probes (QAS):</i></p> <ul style="list-style-type: none"> What did you think of these questions? How did you decide to put yourself within this category? <u>Did you think to answer in any other way?</u> How do you know you are not the other options? Why did you decide to leave this question(s) blank? Where there any problems with answering this question? Did you have any trouble understanding the question? Was it easy? Do we need to change this question? What would be better?
2. Are you familiar with the phrase “sexual orientation” If so, what does it mean?
<p><i>Probes:</i></p> <ul style="list-style-type: none"> Does it relate to identity? Attraction / fantasy? Sexual behaviour or history?
3. In the communities and groups that you are a part of, what types of words, labels, or phrases do people have for people who are attracted to or sexually involved with those of the same sex?
<p><i>Probes:</i></p> <ul style="list-style-type: none"> Are these terms (insert response from Q3) negative, positive, or a combination of both? NOTE: If English is not your first language, what other words do you use to describe Are these communities’ spaces where you fit in and feel accepted? If not, why not?
4. How do you understand your own “sexual orientation”
<p><i>Probes:</i></p> <ul style="list-style-type: none"> Has this understanding changed over time? What’s it like being _____ (insert sexual orientation) Does where you live affect how you think about this? <u>How would you describe the place/area you are living in now?</u> (asked in sex/gender/transgender section) Are there any aspects of how you think about your “sexual orientation” that is affected by parts of your identity or experience (for example, is your “sexual orientation” culturally-specific, or language specific or tied to your race or gender)?
5. With regard to sexual orientation, do you describe yourself differently in different situations, settings, or with different groups (e.g. with friends, family, relatives)?
<p><i>Probes:</i></p> <ul style="list-style-type: none"> Do other people describe you differently in these different situations, settings or groups that you are a part of?
6. If surveys could ask questions in ways that would make most sense to you, how should they ask about sexual orientation?

7. Is it important to include this information on health surveys about sexual orientation ? Why or why not?
8. Is there anything else we haven't talked about yet that you feel is important to aspects of your sexual orientation?

NOW ASK: QAS Sexual Orientation

Transition to next set of question: Ok so before we proceed to the next set of questions I just want to double check the survey questions about sexual orientation. Would you say that there is/isn't a problem with.....

If last set..... FINAL QUESTIONS

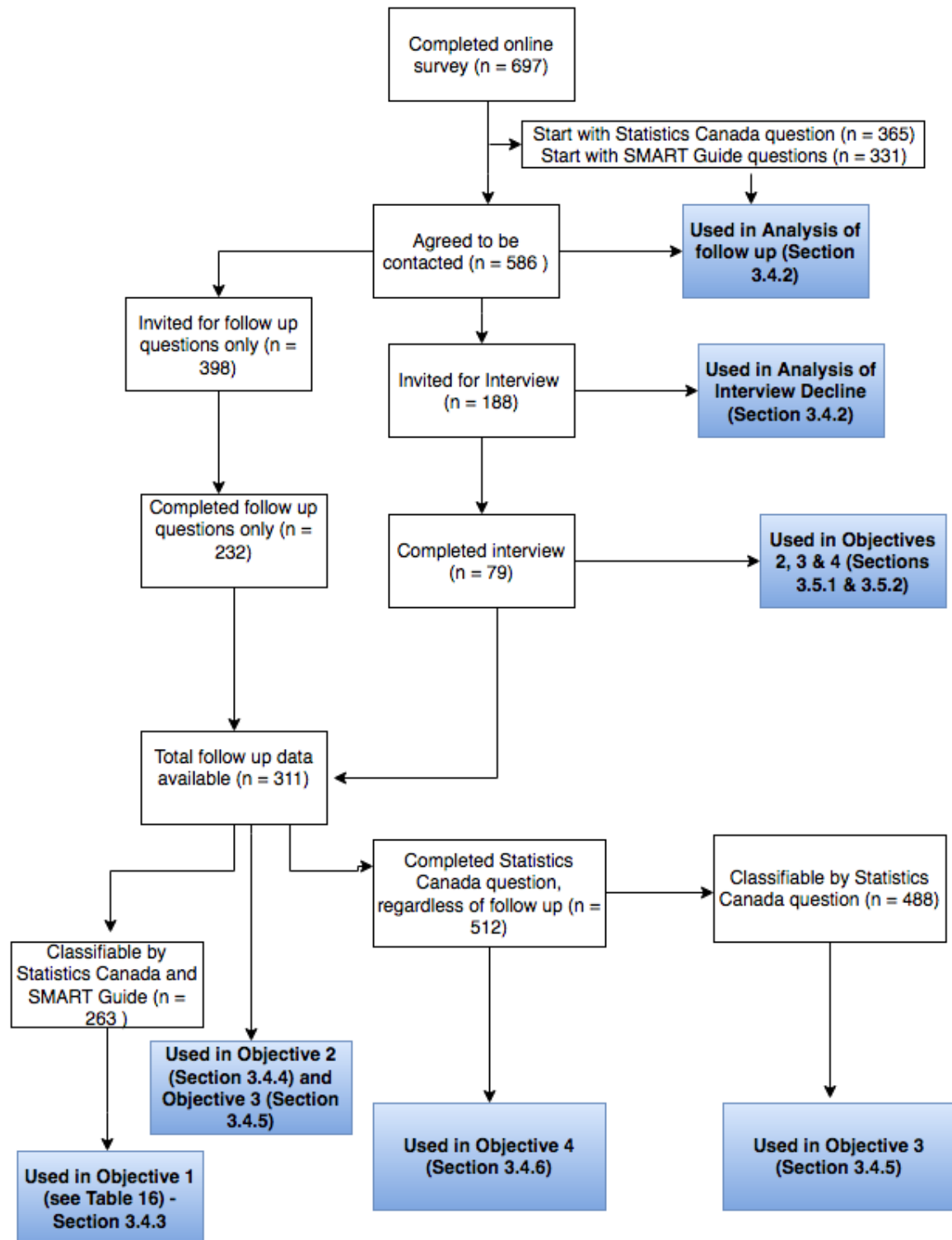
There are two more things that I would like to ask.

9. What, if any, impact does being (**insert disclosed sex, gender, sexual orientation, race/ethnicity**) have on your everyday life?

That is all of our questions. Is there anything else you would like to add?

*****STOP RECORDER**

Appendix H: Inclusion and Exclusion Criteria for Each Analysis



Appendix I: Interview Codebook

Level one seeks to stay as close to participants responses as possible (i.e., how people think about survey questions, how people construct concepts, and how people experience and construct their own identity(ies)). This strategy allows the analysis to move towards a conceptual framework, rather than starting in one.

Code ¹	Sub code	Description
1A. Commentary	1A.2: Sexual orientation	Any comments people make about the sexual orientation question. Here we are also interested in the responses people provide to our question about changing the question/responses to this question. Finally, we are interested in the responses people provide about the importance of a sexual orientation question for health research.
1B. Decision making around survey questions	1B.2: Sexual orientation	The ways that people talk about their decision-making with regards to the sexual orientation question . This code draws attention to the ways that people think about the question itself or the listed responses. Here we are also interested in capturing how people decide what to do/don't do when presented with this question (i.e., automatic response, deduction of available option, etc.).
	1B.4: Best of the worst (added: 25/04/16)	This code captures an commentary around responding to the questions in ways that are 'close enough' or that are the 'best of the worst'
1C. Construction of terms....	1C.4: Sexual orientation	How people talk about sexual orientation ; how sexual orientation is constructed or resisted conceptually and in practice (i.e., how sexual orientation unfolds for people). The focus on the construction of sexual orientation draws attention to the ways that people think about this concept in relation to, and beyond, their own lives - <u>this may/may not be tied to the ways that people describe their sexual orientation</u> . The focus on resistance draws attention to the ways that people construct what is and what is not sexual orientation (i.e., boundary making between sexual orientation and romantic orientation).
	1C.5: Cisnormativity - Conflation of sex and	Here the focus is on what people do when they are asked to define these terms. This code captures, how, when asked about the meaning of sex and gender, people provide a

	gender and sexual orientation	definition that subsumes/incorporates both terms <u>as well as sexual orientation.</u>
	1C.16: Construction of Identity	Any references to the meaning/definition of identity.
	1C.17: Connected Identities	The ways that people construct identities as being connected and linked to each other.
2. Emotion Work	2.1: Emotion Work - Q&R	Where survey questions/responses <u>evoke emotional responses</u> from participants (i.e., stress, anxiety, comfort, sadness, ease, avoidance, fear and/or happiness).
	2.2: Emotion Work - Identities	Where participants <u>experiences of race/ethnicity, sex/gender, or sexual orientation</u> evoke experiences of stress, anxiety, sadness, ease, avoidance, fear, inclusion/exclusion and/or happiness
3A. Identities	3A.5: Sexual orientation	The ways that people talk about their <u>sexuality</u> . The ways that people talk about how others think about their sexuality.

1 Only codes relevant to the thesis were shown here

Appendix J: Demographic of Participants who Completed either Sets of Questions, Regardless of Follow Up

	Number (%) – Completed Statistics Canada Question (n = 512)	Number (%) – Completed SMART Guide Questions (n = 496)
Gender¹		
Male	111 (21.7)	-
Female	348 (68.1)	-
Something Else	52 (10.2)	-
Skipped	1	-
Trans Status¹		
Yes	71 (13.9)	-
No	441 (86.1)	-
Gender Identity¹		
Cisgender	-	392 (79.0)
Trans	-	52 (10.5)
Non-binary	-	52 (10.5)
Sex Assigned at Birth¹		
Male	-	121 (24.5)
Female	-	372 (75.5)
Skipped		3
Residence		
Alberta	29 (5.7)	26 (5.2)
British Columbia (BC)	88 (17.2)	79 (15.9)
Manitoba	15 (2.9)	10 (2.0)
New Brunswick	25 (4.9)	23 (4.6)
Newfoundland and Labrador	2 (0.4)	2 (0.4)
Nova Scotia	22 (4.3)	23 (4.6)
Ontario	288 (56.3)	289 (58.3)
Prince Edward Islands (PEI)	1 (0.2)	0
Quebec	20 (3.9)	19 (3.8)
Saskatchewan	20 (3.9)	22 (4.4)
Northwest Territories, Nunavut, and Yukon	1 (0.2)	1 (0.2)
Skipped	1	2
Education		
Post secondary graduation	388 (75.8)	371 (74.8)
Some post secondary	80 (15.6)	81 (16.3)

Secondary graduation (no post secondary)	29 (5.7)	25 (5.0)
Less than secondary graduation	15 (2.9)	19 (3.8)
Race / Ethnicity²		
White	433 (84.6)	414 (83.5)
South Asian	18 (3.5)	21 (4.2)
Chinese	25 (4.9)	25 (5.0)
Black	17 (3.3)	15 (3.0)
Filipino	4 (0.8)	5 (1.0)
Latin American	10 (2.0)	11 (2.2)
Arab	4 (0.8)	4 (0.8)
Southeast Asian	10 (2.0)	9 (1.8)
West Asian	5 (1.0)	3 (0.6)
Korean	2 (0.4)	1 (0.2)
Japanese	3 (0.4)	3 (0.6)
Another group	13 (2.5)	13 (2.6)
Don't know	0	0
Multiracial (more than one race)	52 (10.2)	55 (11.1)
Skipped	5	4
Age		
14-18	24 (4.7)	29 (5.9)
19-24	89 (17.4)	82 (16.5)
25-34	175 (34.2)	173 (34.9)
35-44	97 (19.0)	109 (22.0)
45-54	70 (13.7)	53 (10.7)
55-64	44 (8.6)	42 (8.5)
65+	12 (2.3)	8 (1.6)
Mean age	35.7	34.9
Religiosity		
Yes	50 (9.8)	59 (11.9)
Somewhat	121 (23.7)	126 (25.5)
No	340 (66.5)	310 (62.6)
Skipped	1	1
Religion		
Christian	127 (24.8)	129 (26.0)
Muslim	12 (2.3)	15 (3.0)
Jewish	23 (4.5)	27 (5.4)
Sikh, Hindu, Buddhist, Neo-pagan	38 (7.4)	41 (8.3)
Agnostic / Atheist	237 (46.3)	215 (43.4)
Other	62 (12.1)	52 (10.5)

Skipped	13 (2.5)	17 (3.4)
First Nations Status		
First Nations, Metis, Inuit	25 (4.9)	22 (4.4)
Non Aboriginal	476 (93.5)	464 (93.7)
Don't know	8 (1.6)	9 (1.8)
Skipped	3	1
Family Immigration History		
Multi Generational Canadian	350 (68.4)	338 (68.2)
First Generation Canadian	80 (15.6)	80 (16.1)
Immigrants	82 (16.0)	78 (15.7)
First language		
English	435 (85.0)	426 (86.1)
French	13 (2.5)	11 (2.2)
Other	64 (12.5)	58 (11.7)
Skipped	0	1
Sexual Orientation (Statistics Canada)¹		
Heterosexual	258 (50.5)	-
Homosexual	96 (18.8)	-
Bisexual	134 (26.2)	-
Don't Know	23 (4.5)	-
Skipped	1	-
Sexual Identity (SMART Guide)³		
Straight	-	251 (51.0)
Gay / Lesbian	-	91 (18.5)
Bisexual	-	119 (24.2)
Don't Know	-	31 (6.3)
Skipped	-	4

1. Data not available for those who completed only one of the two sets

2. People can choose more than one race, so will not add up to 100%

3. Other information from SMART Guide (such as sexual behaviour and attraction) requires their gender response to the OHS questions, which was unavailable for some participants who only completed the SMART Guide question. Hence these numbers are not presented.

Appendix K: Demographic Differences in Participants who Completed Follow Up and Interview Requests

Bivariate Analysis of Follow Up and Interview Completion– Started with Set A

Demographics		Follow Up Analysis – n (%) N = 365		Interview Analysis – n (%) N = 86	
		Loss to Follow Up ²	Interview or Follow Up	Declined	Completed
Sexual Minority – Statistics Canada					
	Heterosexual	106 (55.2)	86 (44.8)	33 (68.8)	15 (31.3)
	Minority	89 (54.9)	73 (45.1)	17 (48.6)	18 (51.4)
	Undetermined	5 (45.5)	6 (54.6)	0	3 (100)
Overall p-value ¹		0.80		0.01	
Trans Status					
	Cisgender	183 (56.4)	141 (43.7)	46 (63.0)	27 (37.0)
	Trans	18 (42.9)	24 (57.1)	4 (30.8)	9 (69.2)
Overall p-value ¹		0.10		0.04	
Ethnoracial Background					
	Aboriginal (First Nations, Metis or Inuit)	14 (73.7)	5 (26.3)	6 (60)	4 (40)
	White (non Aboriginal)	154 (56.0)	121 (44.0)	34 (72.3)	13 (27.7)
	Racialized (non white)	32 (46.4)	37 (3.6)	10 (35.7)	18 (64.3)
Overall p-value ¹		0.09		0.008	
Religiosity					
	Yes	15 (41.7)	21 (58.3)	6 (66.7)	3 (33.3)
	Somewhat	46 (55.4)	37 (44.6)	11 (47.8)	12 (52.2)
	No	140 (56.9)	106 (43.1)	33 (61.1)	21 (38.9)
Overall p-value ¹		0.23		0.54	
Education					
	post secondary graduation	147 (53.5)	128 (46.6)	34 (57.6)	25 (42.4)
	some post secondary	33 (55.9)	26 (44.1)	8 (57.1)	6 (42.9)
	secondary graduation (no post secondary)	15 (68.2)	7 (31.8)	6 (66.7)	3 (33.3)
	less than secondary graduation	6 (60)	4 (40)	2 (50)	2 (50)

Overall p-value ¹		0.60		0.98	
Age					
	14 to 18	7 (50)	7 (50)	4 (57.1)	3 (42.9)
	19 to 24	39 (57.4)	29 (42.7)	9 (50)	9 (50)
	25 to 34	62 (52.5)	56 (47.5)	15 (62.5)	9 (37.5)
	35 to 44	37 (52.1)	34 (47.9)	5 (45.5)	6 (54.6)
	45 to 54	35 (64.8)	19 (35.2)	9 (90)	1 (10)
	55 to 64	11 (37.9)	18 (62.1)	3 (30)	7 (70)
	65+	9 (81.8)	2 (18.2)	5 (83.3)	1 (16.7)
Overall p-value ¹		0.16		0.11	
Youth Status					
	14 to 24	47 (56.6)	36 (43.4)	11 (52.4)	10 (47.6)
	25+	154 (54.4)	129 (45.6)	39 (60)	26 (40)
Overall p-value ¹		0.80		0.61	
Family Immigration History					
	Multi Generational Canadian	138 (55.2)	112 (44.8)	34 (66.7)	17 (33.3)
	First Generation Canadian	33 (56.9)	25 (43.1)	6 (37.5)	10 (62.5)
	Immigrants	29 (50.9)	28 (49.1)	10 (52.6)	9 (47.4)
Overall p-value ¹		0.79		0.11	
Total		201 (54.9)	165 (45.2)	50 (58.1)	36 (42.0)

¹ Fisher's exact test was used since some cells were very sparse

² Include those who did not provide their contact

Bivariate Analysis of Follow Up and Interview Completion– Started with Set B

Demographics		Follow Up Analysis – n (%) N = 331		Interview Analysis – n (%) N = 101	
		Loss to Follow Up ²	Interview or Follow Up	Declined	Completed
Sexual Minority – SMART Guide					
	Heterosexual	42 (61.8)	26 (38.2)	38 (52.1)	35 (48.0)
	Minority	123 (53.7)	106 (46.3)	8 (61.5)	5 (38.5)
	Undetermined	20 (58.8)	14 (41.2)	12 (80)	3 (20)
Overall p-value ¹		0.48		0.14	
Gender Identity					
	Cisgender	152 (58.7)	107 (41.3)	40 (62.5)	24 (37.5)
	Trans	17 (51.5)	16 (48.5)	9 (60)	6 (40)
	Non-binary	16 (41.0)	23 (59.0)	9 (40.9)	13 (59.1)

Overall p-value ¹		0.10		0.21	
Ethnoracial Background					
	Aboriginal (First Nations, Metis or Inuit)	11 (64.7)	6 (35.3)	4 (50)	4 (50)
	White (non Aboriginal)	141 (55.5)	113 (44.5)	43 (64.2)	24 (35.8)
	Racialized (non white)	33 (55.9)	26 (44.1)	10 (40)	15 (60)
Overall p-value ¹		0.81		0.09	
Sex Assigned at Birth					
	Male	49 (57.0)	37 (43.0)	23 (57.5)	17 (42.5)
	Female	135 (55.3)	109 (44.7)	34 (56.7)	26 (43.3)
Overall p-value ¹		0.80		1	
Religiosity					
	Yes	24 (63.2)	14 (36.8)	10 (58.8)	7 (41.2)
	Somewhat	51 (57.3)	38 (42.7)	15 (65.2)	8 (34.8)
	No	110 (53.9)	94 (46.1)	33 (54.1)	28 (45.9)
Overall p-value ¹		0.55		0.66	
Education					
	post secondary graduation	130 (53.5)	113 (46.5)	35 (55.6)	28 (44.4)
	some post secondary	34 (61.8)	21 (38.2)	11 (55)	9 (45)
	secondary graduation (no post secondary)	11 (61.1)	7 (38.9)	3 (42.9)	4 (57.1)
	less than secondary graduation	10 (66.7)	5 (33.3)	9 (81.8)	2 (18.2)
Overall p-value ¹		0.54		0.34	
Age					
	14 to 18	12 (53.6)	10 (45.5)	8 (66.7)	4 (33.3)
	19 to 24	32 (60.4)	21 (39.6)	8 (57.1)	6 (42.9)
	25 to 34	60 (51.3)	57 (48.7)	18 (60.0)	12 (40.0)
	35 to 44	49 (65.3)	26 (34.7)	11 (55)	9 (45.0)
	45 to 54	18 (52.9)	16 (47.1)	5 (45.5)	6 (54.6)
	55 to 64	9 (37.5)	15 (62.5)	3 (33.3)	6 (66.7)
	65+	5 (83.3)	1 (16.7)	5 (100)	0
Overall p-value ¹		0.15		0.33	
Youth Status					
	14 to 24	44 (58.7)	31 (41.3)	14 (60.9)	9 (39.1)
	25+	141 (55.1)	115 (44.9)	44 (56.4)	32 (43.6)
Overall p-value ¹		0.60		0.81	

Family Immigration History					
	Multi Generational Canadian	126 (55.8)	100 (44.3)	38 (60.3)	25 (39.7)
	First Generation Canadian	33 (60.0)	22 (40.0)	8 (44.4)	10 (55.6)
	Immigrants	26 (52.0)	24 (48.0)	12 (60)	8 (40)
Overall p-value ¹		0.72		0.53	
Total		185 (55.9)	146 (44.1)	58 (57.4)	43 (42.6)

¹ Fisher's exact test was used since some cells were very sparse

² Include those who did not provide their contact

Curriculum Vitae

Name: Christoffer Dharma

Post-secondary Education and Degrees: The University of Western Ontario
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Publications:

Dharma, C., Bauer, GR. (2016) Understanding Sexual Orientation in Canada: Who Are We Capturing and Who Are We Missing from Statistics Canada Sexual Orientation Measures?. Manuscript submitted to the *Canadian Journal of Public Health*

Dharma, C., Scheim, A.I., Bauer, G.R. (in preparation) Development of Condom / Barrier Self Efficacy and Sexual Body Image Scales for Transgender Population: An Exploratory Factor Analysis. For Submission to the *Journal of Sex Research* by July 31st 2016.

Bauer, G.R., Scheim, A.I., Braimoh, J., Dharma, C. (in preparation) Evaluating Trans-inclusive Population Survey Measures of Sex/Gender. For Submission to the *Social Science & Medicine Population Health*, by August 31st 2016.

Presentations:

Dharma, C., Bauer, G. R., Braimoh, J. (2016). Evaluation of Sexual Orientation Items in Population Health Surveys among Canadians: A Mixed Methods Approach. Poster and oral presentation at the 2016 *Guelph Sexuality Conference*, Guelph, ON. Presented on June 23rd and 24th 2016.

Dharma, C., Bauer, G. R., Braimoh, J. (2016). Evaluation of Sexual Orientation Items in Population Health Surveys among Canadians: A Mixed Methods Approach. Oral presentation at 2016 *Canadian Society for Epidemiology and Biostatistics (CSEB) National Student Conference* Winnipeg, MB, Presented on June 10th 2016.

Dharma, C. (2016). Evaluation of Sexual Orientation Items in Population Health Surveys among Canadians: A Mixed Methods Approach. Oral presentation at the 2016 *Queer Research Day*, London, ON. Presented on April 20th 2016.

Dharma, C., Bauer, G. R., Braimoh, J., Scheim, A. I., Zou, G. Y. (2016). Evaluation of Sexual Orientation Items in Population Health Surveys among Canadians: A Mixed Methods Approach. Poster presentation at the 2016 *London Health Research Day*. Presented on March 29th 2016.

Dharma, C., (2016). Who's Gay? Depends on How You Ask. Oral presentation at the 3 *Minutes Thesis Competition* at Schulich School of Medicine and Dentistry, London, ON. Presented on March 15th 2016.

Bauer, G. R., Scheim, A. I., Dharma, C., Braimoh, J. (2016) Improving LGBT Health Data: Assessing Survey Measures of Sex, Gender and Sexual Orientation. Panel presentation at the *Rainbow Health Ontario 2016 Conference*, London, ON, Presented on March 10th 2016.